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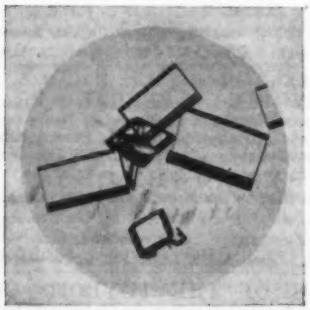

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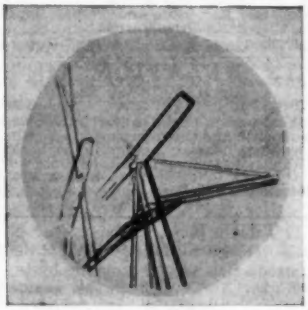

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ANY assessment of success or failure in medicine which is based on fact rather than on opinion must nearly always be expressed in some numerical form—e.g., when the medical observer reports that he has treated so many cases with a favourable result in such and such a proportion, or the public health worker assesses the attack-rate on a population inoculated against some infection. We have reason to believe that there is now a steadily increasing demand among both clinical and public health workers for some knowledge of the elementary statistical technique, which will enable them to interpret figures or to analyse and test their meaning. Dr. Hill has succeeded in demonstrating clearly some of the ways in which investigations can be planned and figures derived from them can be analysed in order to yield fruitful results, choosing examples from medical publications to illustrate both the types of problems with which the medical worker is faced and the kinds of error he is most liable to make.

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ADDRESSES AND ORIGINAL ARTICLES

THE FUNCTION OF THE BRONCHIAL TUBES*

BY MAXWELL ELLIS, M.D., M.S. Lond., F.R.C.S. Eng.†

ASSISTANT SURGEON TO THE GOLDEN SQUARE THROAT HOSPITAL, AND AURAL SURGEON TO THE PRINCESS BEATRICE HOSPITAL, LONDON

WHILE an assistant in the Chevalier Jackson Bronchoscopic Clinic some years ago I became interested in the movements of the bronchial tubes, especially in cases of asthma where the phenomenon is particularly vivid. There is no concise and well-documented account of the function of these tubes—even the structure has not been fully elucidated—the difficulty being that research workers were unable to record the movements directly. The bronchoscope removed this objection, at least for the larger bronchi, and I was able to devise a method of recording the changes in calibre and length. It is with the former change that this lecture will be chiefly concerned.

ANATOMY

The trachea divides into two main bronchi which in turn branch into smaller tubes. The smallest tube in this conducting portion of the bronchial tree is the terminal bronchiole. From this arise respiratory bronchioles, in the walls of which there are the alveoli. The respiratory bronchioles lead to alveolar ducts which branch into other alveolar ducts. Their walls bear alveoli and bulbous enlargements, the alveolar sacs, in which the ducts also terminate. The walls of these sacs are formed by alveoli, the portion of lung tissue where the gaseous exchange with the blood occurs. I may say here that some histologists give a slightly different account of the respiratory unit, but that briefly described above and illustrated (Fig. 1) is most commonly accepted—e.g., Miller (1921), except for his postulate of "atria" intervening between the alveolar ducts and alveolar sacs.

The structure of these tubes was first accurately described by Reisseisen (1822) who painstakingly dissected with hand lens, scalpel and forceps. The bronchial muscle is named after him, and he traced it nearly to the terminal bronchioles. Since then, Miller has contributed much valuable information in a series of papers spread over nearly forty years, especially concentrating on the muscle-fibre distribution in the respiratory bronchiole and its offshoots. Many others have worked successfully in this field and a full bibliography will be found in Macklin's review of the subject (1929).

Essentially, the tubes consist of a myo-elastic network with the larger branches stiffened by fibro-cartilage. In the trachea, this latter structure is in the form of incomplete hoops, open posteriorly where smooth-muscle fasciculi bridge across the gaps, being attached to the edges of the hoops on the inner surfaces. These fasciculi branch, connecting several rings at different levels, and, at the bifurcation, these oblique strands come to lie in the long axis of the tubes. In the larger bronchi, this network structure of muscle-fibres loses its attachment to the cartilage, now consisting of irregularly arranged plaques, and becomes a continuous sheet embracing the whole circumference of the tubes internal to the plane of the cartilage. The strands assume a more spiral direction, enclosing lozenge-shaped areas. This arrangement is continued on the same morphological plan into the terminal bronchioles, and, although the actual mass of muscle becomes less, it occupies a higher proportion of the wall of the tubes. In the respiratory bronchioles, the fasciculi are more delicate and enclose the origins of alveolar duct and alveolus out-pouchings, and the same almost sphincteric formation as far as the alveoli are concerned is preserved in the alveolar ducts.

Closely following the arrangement of the muscle-fibres is a network of elastic tissue. In the larger tubes it consists of two distinct portions—one of thin fibres intermixed with the muscle, and the other of stouter fibres on a more internal plane. This

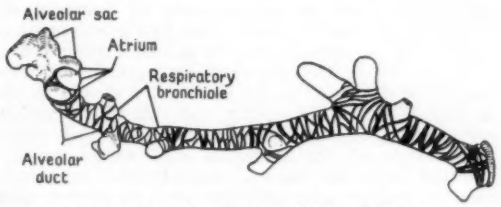

FIG. 1.—Respiratory bronchiole and its subdivisions (after Miller 1921).

segregation is lost in the smaller bronchioles where the two structures coalesce. These two completely separate systems of muscle and elastic tissue can throughout be regarded as a morphological and functional unit, the myo-elastic sheet. Another set of elastic fibres occurs in the adventitia, the connective tissue external tunic of the tubes, and strands pass to it from the myo-elastic layer. The adventitial coat eventually forms the stroma of the alveoli. Both these layers contain many blood-vessels and nerves. The vessels of the conducting portion of the airway (both in the adventitial and myo-elastic layers) are derived from the bronchial arteries and, in the respiratory portion, from the pulmonary arteries. They are united by a capillary anastomosis. The mucous membrane rests on a loose, vascular tunica propria (containing the internal elastic membrane of the larger tubes, described above) which intervenes between it and the myo-elastic tunic. Mucous glands occur between the latter and the cartilaginous coat with ducts piercing the muscle.

THEORIES OF FUNCTION

The striking feature of the physiology of the lungs is motion, and the changes undergone by its various constituents during respiratory movements have always been the subject of speculation and inquiry. From the structure that he had uncovered Reisseisen deduced that the bronchial tubes elongate and widen during inspiratory movements and shorten and contract with expiratory ones. As the chest wall moves outwards and the diaphragm downwards in inspiration, the lung following, the bronchi of the middle and lower lobes must necessarily lengthen. Keith (1909) described a direct connexion between the crura of the diaphragm and the lung roots whereby the latter are dragged downwards during contraction

* A Hunterian lecture delivered at the Royal College of Surgeons on Jan. 28th.

† From the Chevalier Jackson Bronchoscopic Clinic, Philadelphia, and the Medical Unit, University College Hospital, London. For three of the four years over which the work in this paper was spread the author held the Geoffrey E. Duveen studentship in oto-rhino-laryngology of the University of London, and it was completed during the tenure of the Percival Alleyn scholarship for surgical research at University College Hospital.

of the former, producing elongation of the upper lobe bronchi. These respiratory length changes were portrayed by Bullowa and Gottlieb (1920) using radio-opaque oils in the bronchi and X rays, and their existence has many times since been confirmed by other workers. Ingals (1905) and Jackson (1917) actually saw these movements through the bronchoscope, and Weingaertner (1920) measured in man the vertical displacement of the carina by introducing endoscopically an aluminium pointer straddling the bifurcation. I was able at various points in the larger bronchi of dogs to fix a hook carrying a thread which passed through the bronchoscope and was attached to a writing-lever recording on a kymograph. The actual longitudinal distance traversed by the particular point in the tubes was thus measured.

If the tubes were composed of some elastic material, elongation would be accompanied by constriction. Reisseisen decided, however, that thoracic expansion must result in widening as well as lengthening of the bronchi. From the network arrangement of the muscle he deduced that its contraction should result in shortening and narrowing, and that its relaxation can permit of the opposite changes. The other constituents of the bronchial wall would readily allow of these movements. Experimental investigation of calibre changes was slow to follow the theoretical deductions of the anatomist. Indeed, practical inquiry into the function of the bronchial muscle and tubes has been so difficult of achievement that detailed knowledge is still lacking.

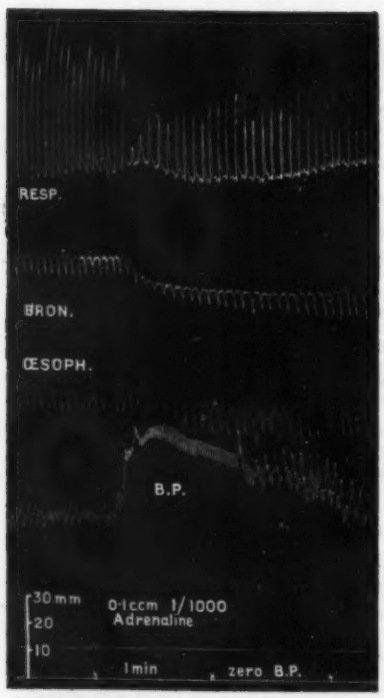

FIG. 3.—Adrenaline effect on bronchus.

The invention of the bronchoscope led to the observations of Ingals and Jackson noted above on changes in length. They described, in addition, expansile and contractile movements synchronous with respiratory movements and occurring respectively in the inspiratory and expiratory phases.

Previously, Dixon and Brodie (1903) measured the increase and decrease in volume of a lobe of the lung encased in a plethysmograph. Sandmann (1890) concentrated on the measurement of intratracheal and Jackson (1913) on intrapleural pressures. MacGillavry (1877) passed air through the trachea at a constant rate, allowing it to escape through scarifications of the surface of the lungs, and measured the variations in intratracheal pressure. McDowall and Thornton (1930) adopted the same method but used fluids instead of air. Einthoven (1892) forced air into the lungs and allowed their natural elasticity to expel it, measuring the intratracheal pressures. Trendelenburg (1912) studied the reactions of isolated strips of bronchial muscle of the ox and sheep. Bullowa and Gottlieb (1920) observed fluoroscopically the behaviour of the bronchi outlined with iodised oil.

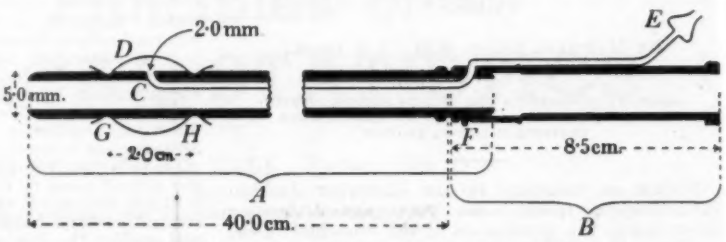

FIG. 2.—Special bronchoscope (explanation in text).

The methods adopted by all these workers for registering intrabronchial alterations in volume can be severely criticised. In addition, the animals were always under very abnormal conditions of working, and, in many cases, the organs were entirely isolated. The method given below as well as being very sensitive is largely free of these objections.

EXPERIMENTAL METHOD

The following account is taken substantially from the original paper (Ellis and Livingston 1935). The principle involved is merely the insertion of a balloon into a given portion of a dog's bronchus through a special bronchoscope and the recording of its volume changes, which reflect the changes in calibre of the bronchus.

Apparatus.—The special instrument devised (Fig. 2) consists of a brass tube 48·5 cm. long and 4·0 mm. external diameter, carrying an inner tube of 2·0 mm. external diameter. One end of this latter tube opens, as shown, into a cylinder of rubber (D) attached at G and H to make a balloon, and the other end is drawn outwards into a side tube (E), leading to the recording apparatus. The instrument is constructed in two sections (A and B) connected by a bayonet joint (F) in such a way that, when it is fully closed, the lumen of each tube is continuous and airtight, as proved by blowing air through E, which inflates the balloon, and through the main tube, which does not do so. At first, it was thought that the section (C) between G and H should be flexible, and in the earlier instruments it was constructed of gum-elastic. Subsequently this was found not to be necessary and the thickness of the gum-elastic, encroaching on the lumen, was a disadvantage. Later instruments were therefore made entirely of thin brass, 5·0 mm. in external diameter, and this was finally reduced to 4·0 mm. The outer tube can be closed off, but is usually allowed to remain open to permit of free circulation of respiratory air in the portion of the lung distal to the balloon, an essential difference from the method employed by Roy and Brown (1885).

The balloon is made from a cylinder of thin sheet rubber, using rubber cement, and fastened to A with silk threads at G and H. The cylinder is made of larger bore than the bronchial tube so that it can be well inflated with air and yet not exert an elastic pressure on its contents. This also ensures that a large area of the balloon will be in contact with the walls of the bronchus for the reception of movements. Calculation shows that a change in calibre of the bronchus from 8·0 mm. diameter to 5·0 mm. results in a change in volume of about 0·6 c.cm. in a segment 2·0 cm. long (G H of Fig. 2). A sensitive recording apparatus is thus essential. A volumetric method—through thick-walled rubber tubing to a small Brodie bellows equipped with an aluminium writing point—was found satisfactory in registering these small changes. In calibration, the introduction into the recording system of 0·1 c.cm. of air by a hypodermic needle inserted obliquely through the wall of the rubber tubing caused an elevation of the writing point of about 1·0 cm.

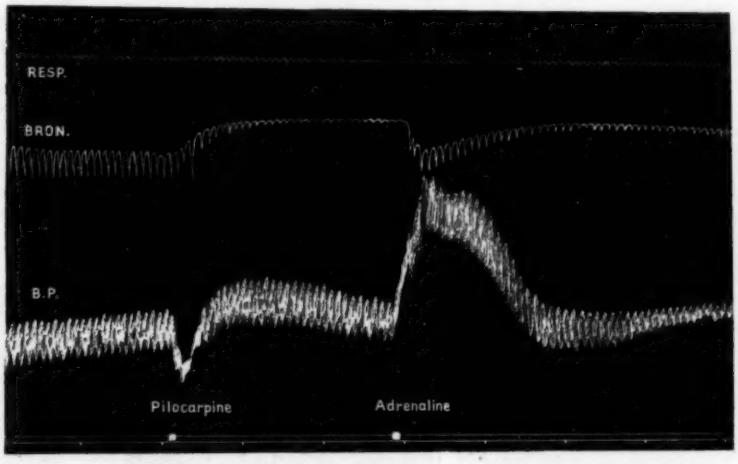

FIG. 4.—Transitory adrenaline effect on bronchus already constricted by pilocarpine.

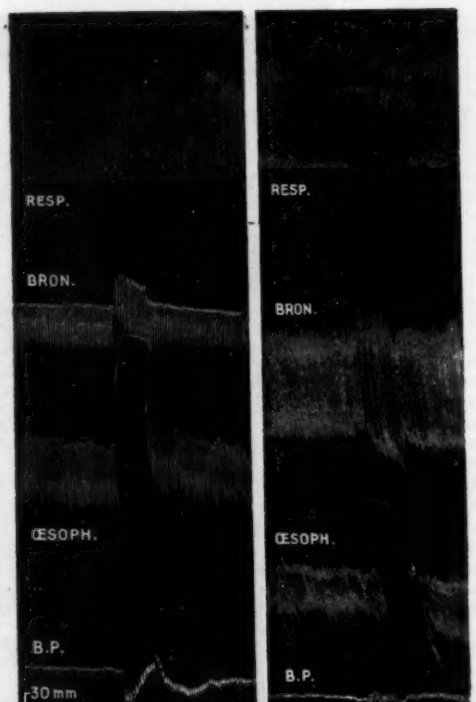

FIG. 5.—Vago-sympathetic stimulation (A) before, and (B) after atropine.

Material.—Dogs varying in weight from 7·0 to 9·0 kg. were found to be most suitable, larger animals requiring a longer bronchoscope than is convenient for use. Anæsthetisation was sometimes carried out with subcutaneous morphine sulphate followed by intraperitoneal sodium amytal, and sometimes with intravenous chloralose (0·1 g. per kg. body-weight). A few animals were decerebrated.

Method.—After inspection of the bronchial tree with a Jackson bronchoscope, 30·0 cm. long and made with a "full lumen" of 8·0 mm. diameter to facilitate the introduction of the special instrument described above, the distal portion of the latter (A) is moistened with water and introduced to the desired position through the bronchoscope which is then withdrawn over it. The proximal piece of the instrument (B) is affixed, and the inner tube connected with the Brodie bellows which is always tested for leaks immediately before use. A side tube with a clamp is used to inflate the cylinder and distend the bellows. A simultaneous record of respiratory movements is taken by a pneumatic stethograph applied to the surface of the chest wall communicating with a Brodie bellows. A blood-pressure tracing is obtained from the left femoral artery with a mercury manometer.

Examples of records obtained with the apparatus showing its delicacy are given in Figs. 3 and 4 where the changes produced by adrenaline and pilocarpine are seen. Fig. 3 shows an adrenaline effect which can be obtained as a routine with this preparation, but which has never previously been clearly demonstrated. From this result it can be deduced that the sympathetic nerves have some power in maintaining the bronchial lumen at a given diameter. Fig. 4 gives a striking picture of the transitory effect of adrenaline on an already constricted bronchus. In Fig. 5, results of stimulation of the peripheral end of the vago-sympathetic trunk before and after the administration of atropine shows that the sympathetic fibres are overweighted by the parasympathetic ones, but exert their dilating effect when the latter are put out of action. A record from the interior of the œsophagus is shown in these three figures obtained with an instrument similar to that used in the bronchus. The very great contraction of the œsophagus on vagal stimulation is striking. It also occurs, but to a lesser degree, after atropine, and is perhaps due to the spread of current to the striped muscle walls of the tube. This point will be referred to later.

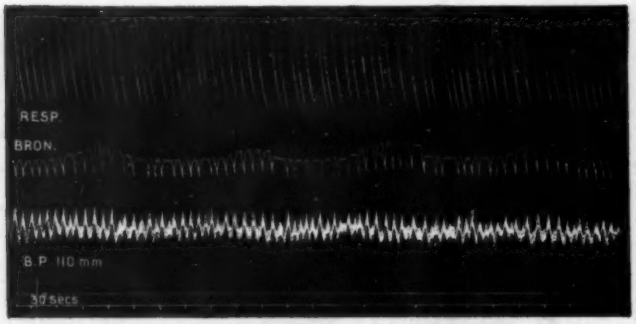

FIG. 6.—Simultaneous contraction waves in bronchus, chest wall, and blood pressure.

RHYTHM AND TONE

All the records show that the bronchus contracts and dilates rhythmically and that there is also an identical rhythm in the tracings of the thoracic wall movements and the blood pressure. In Fig. 6 another and slower type of rhythmic movement is seen, also reduplicated in the thoracic wall and blood-pressure tracings. Previous workers, particularly Einthoven (1892), Dixon and Brodie (1903) and Bullowa and Gottlieb (1920 and 1922), have described "peristaltoid" movements in the bronchi, and have compared them with the peristaltic waves of the small intestine. The methods employed by the first two workers are technically unsound and have been discussed and criticised by Trendelenburg (1912) who was unable, in his experiments, to reproduce their results. No records of the third group of workers show any definite movements of this sort, and their deductions were chiefly made from observations on the fluoroscopic screen of the behaviour of the bronchi when filled with iodised oil.

There is some indirect evidence that there are waves of relaxation and contraction. Lewis (1924), working with tissue-culture preparations of chick embryo lung, noticed rhythmic contractions and also a wave-like motion passing along the tubes. Henderson, Chillingworth, and Whitney (1915) demonstrated that the volume of the "dead space" (the total capacity of the interior of the bronchial tree) varies from time to time, sometimes rhythmically with a period of several minutes.

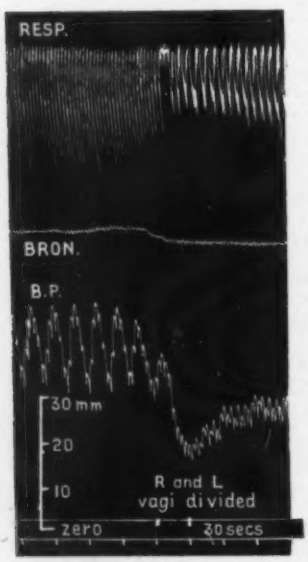

FIG. 7.—Hypertonic effect of parasympathetic nerves after division of vagi. Large part of chest wall resected, diminishing movements.

The postulate of peristalsis requires more precise evidence than that noted above, since it must be shown that a wave of relaxation is immediately followed by a wave of contraction. The tracing in Fig. 6 merely indicates that a contraction occurs, and other similar records show either contraction or relaxation from a certain level, but never both. The parallel variation in the chest wall and blood-pressure tracings suggest that all these effects may be manifestations of rhythmic changes in the higher centres. An accurate investigation of peristaltic movements would require records from two fixed points in the same tube. This has not been obtained, but the above analysis of records which have been obtained from one fixed point indicates that the phenomenon is more in the nature of a rhythmic increase or decrease in tone.

It has been mentioned above and demonstrated in Figs. 4 and 5B that the administration of adrenaline or the stimulation of the sympathetic fibres in the vago-sympathetic trunk relaxes the bronchi, that is, decreases the tone. (In a few experiments, adrenaline was found to cause an increase in tone, a finding independently confirmed by Kiese (1935), but this may be an unusual central effect of the coincident rise in blood pressure.) Pilocarpine (Fig. 4), or stimulation of the peripheral end of the vagus (Fig. 5A) causes an increase in tone of the bronchial muscle.

Another type of experiment to demonstrate that the parasympathetic nerves exert a constant hypertonic effect is shown in Fig. 7. A large portion of the chest wall on the right side has been removed (see below) diminishing the movements simultaneous with the respiratory ones. Division of the vagus nerves results in an immediate diminution in tone of the bronchus. The tonic effect of stimulation of the peripheral end of the right vagus under the same conditions is shown in Fig. 8. To exclude effects from without due to tetanic contraction of the striped œsophageal muscle (Ellis and Livingston 1935, and Fig. 5) the experiments were repeated with the œsophagus immobilised by being filled with plaster-of-Paris. The same results were obtained.

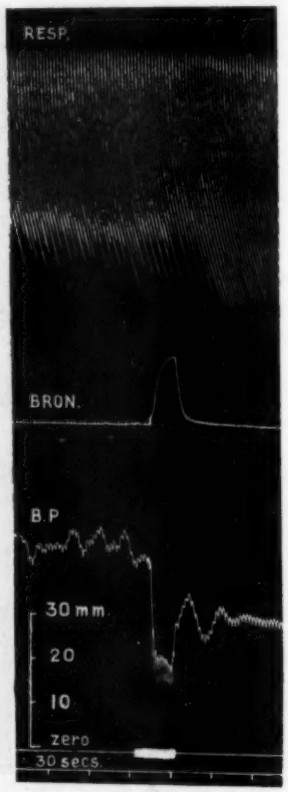

FIG. 8.—Same condition as Fig. 7. Stimulation of peripheral end of right vagus.

REFLEX EFFECTS

It has been observed by many bronchoscopists (Clerf 1927) that in certain cases of asthma between actual attacks there is increased tone in the bronchial tree, as evidenced by the excessive occlusion in the expiratory phase of respiration. Examination of these cases often reveals, in the smaller tubes, a little very viscid secretion. Mechanical removal of this frequently leads to a temporary cessation of attacks, and needs to be repeated at intervals of increasing length until no longer required. The preparation of an autogenous vaccine from the secretion is sometimes possible and often effects a cure, another item in the proof of its abnormality. It is difficult to escape the conclusion that the secretion is acting as a local irritant to the bronchial mucous membrane and initiating the sensory arc of a reflex broncho-constriction. This results in hypertonus of the bronchial muscle, which occasionally becomes maximal as an asthmatic seizure. It has not been possible to demonstrate experimentally this reflex from the smaller bronchi, but it forms part of a more generalised reflex of familiar occurrence—the protective cough following the inhalation of a foreign body or irritant substance into the bronchial tree. The sense of constriction that persists for some time afterwards is probably due to hypertonus of the bronchial tubes. A similar effect occurs in some cases of bronchitis.

The upper part of the respiratory tract consists chiefly of the nasal cavities. Most of the lining mucous membrane of these cavities in man is concerned with respiration and supplied by the trigeminal nerve. Although the lining mucosa of the dog is chiefly olfactory it is supplied, for common sensation, also by the trigeminal nerve. No controlled experiments in the human have been carried out that show any clear relationship between the nasal mucosa and the bronchial muscle, although there is a good deal of hypothesis based on clinical observations. As a negative finding it can be stated that stimulation of the normal nasal septum or inferior turbinals with a faradic current which is just unpleasant when placed on the tongue gives rise to no sense of retrosternal constriction, but it is not known how much bronchial contraction is necessary to produce such a sensation.

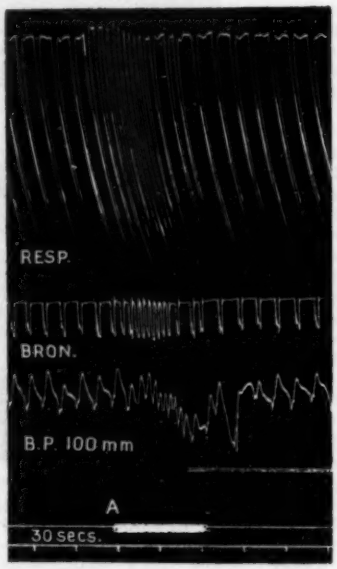

FIG. 9.—Respiration quickening. Effect of septal stimulation (ammonia) in vagotomised animal.

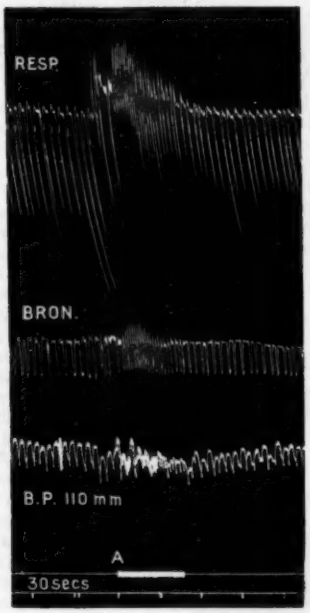

FIG. 10.—Hypertonus and quickening following stimulation of the nasal cavities with ammonia.

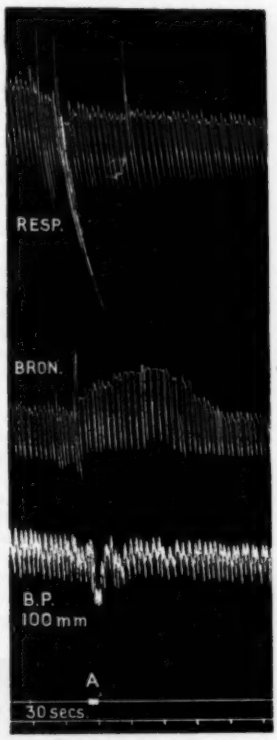

FIG. 11.—Hypertonus only following stimulation of the right side of the septum with a faradic current.

The classical animal experiments were performed by Kratschmer (1870) who showed that the effect of irritant gases on the nasal mucous membrane is a cessation of the respiratory movements in the expiratory phase, and also that the trigeminal nerve is the sensory arc of the reflex. Sandmann (1890) declared that a broncho-constriction occurred, since there is an increase of the intratracheal pressure during this stimulation. Houssay and Cruciani (1929) working with a Heymans preparation of cross-circulation dogs, measuring bronchial movements by Jackson's method (see above) and stimulating with ammonia vapour, came to the same conclusion.

In a series of experiments using my direct method of recording alterations in bronchial tone very variable results were obtained.

The nasal mucosa was stimulated with the faradic current or irritant gases. When the former was used, the nasal cavities were inspected with a head mirror and a speculum and areas selected with precision. When the latter were used, the larynx—and thus the more distal parts of the respiratory tract—was sometimes separated from the nasal

cavities by a proximal ligature. On other occasions, the nasal cavities were isolated by firmly packing-off the post-nasal space with gauze.

Where positive changes were observed they could be divided into two groups. In the first group, the striking feature was the increase in respiratory rate, and this occurred with both forms of stimulation. It is independent of the vago-sympathetic trunks, as is shown in Fig. 9, and must be a central radiation down the cord to the spinal nerves supplying the great muscles of respiration (the motor arc). In the second group, alterations in bronchial tone occurred with or without concurrent increase in the respiratory rate. Fig. 10 is an example of both changes, that of hypertonus being pronounced, and they disappear with cessation of the stimulus (Ellis 1936). In Fig. 11, hypertonus alone has occurred and lasted several minutes longer than the duration of the stimulus.

An interesting result is shown in Fig. 12 where an area on the left side of the septum was stimulated with a faradic current and caused a prolonged bronchial constriction. Bilateral vagotomy abolished the reflex. This is proof that the naso-bronchial reflex is not a homo-lateral phenomenon as has been widely held, but is certainly contra- and probably bi-lateral. The evidence for the old belief was chiefly clinical, and the observations not very reliable. Unilateral asthma due to nasal polypi on the same side is postulated, but no post-mortem material has been produced to support the theory, and no convincing experimental evidence.

Reflexes from other sites were explored, and special attention was paid to the sensory nerves. Only on rare occasions were bronchial changes observed independent of respiratory ones. Such an occasion gave rise to Fig. 13, where the central end of the sciatic nerve was stimulated with an electric current. A slight increase in the amplitude of the respiratory movements occurred and this was paralleled in the bronchus where also there was a slight rise in tone of longer duration than that of the stimulus.

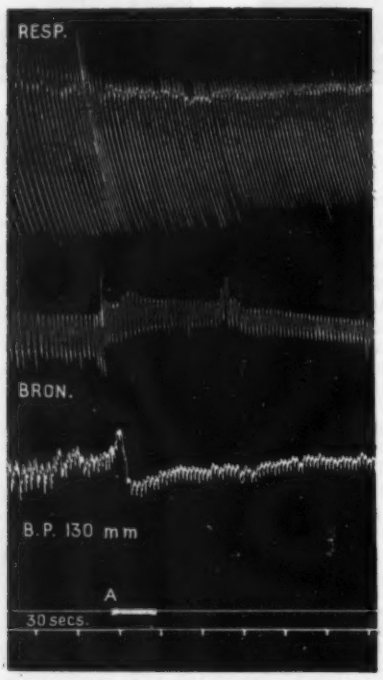

FIG. 12.—Faradic stimulation of left side of septum causing prolonged bronchial constriction: abolished by bilateral vagotomy.

RHYTHMIC CHANGES IN CALIBRE

The foregoing account has been concerned with the demonstration that there is a normal tone in the bronchial tree which is subject to spontaneous rhythmic variation and can also be influenced reflexly. I have already mentioned, and it will have been noted on the tracings used in illustration, that the lumen of the bronchus undergoes more frequent changes than those with which I have so far been concerned and these will next be discussed.

FIG. 13.—Effect of stimulating central end of sciatic nerve; slight increase in tone of bronchi and increased amplitude of respiration.

The direct method of recording alterations in diameter of the bronchi has proved ideal for the analysis of the changes in calibre which have long been thought to occur during respiratory movements. Theoretical deductions from the structure of the tubes and some of the earlier experiments and observations have been discussed above. In my records it is clearly shown that the bronchial lumen widens during the inspiratory phase and narrows during the expiratory phase of respiration, and that these alterations in bronchial calibre are synchronous with the respiratory movements and always accompany them. The mechanism of these rhythmic changes in calibre has been fully investigated (Ellis 1936), and only a short account will be given here.

There are three possible sources for the production of these movements:—

(1) An intrinsic rhythm of the smooth muscle in the walls of the tubes.

(2) The result of nervous impulses carried in the vagus or sympathetic nerves.

(3) A mechanical result of chest wall movements, the dilatation being purely passive.

The first hypothesis was negatived by Trendelenburg (1912) who used isolated strips of ox and sheep bronchial muscle. He found no evidence of spontaneous contractile or expansile power. Indeed, rhythmic contractions at the rate of fifteen a minute would be a property of smooth muscle not found elsewhere in the body.

The second hypothesis has been stated by Starling (1936), where the possibility of active bronchial muscle contraction in the expiratory phase governed by nervous impulses is advanced. There is some indirect supporting evidence. Sensory spindles are

found among the fibres of the bronchial muscle (Larsell 1923, and Gaylor 1934), and sensory fibres leave the lungs (Ranson 1921). In these fibres, at each inspiratory movement, there are action currents (Adrian 1933) that resemble the discharges from stretch receptors in voluntary muscle. There may thus be a reflex arc with a stretch impulse on the sensory and broncho-constriction on the motor side. I have shown, however, that after bilateral vagotomy (broncho-constrictor nerves) the alterations in calibre become greater. Also—if artificial respiration is given—division of the spinal cord in the lower cervical region and consequent abolition of broncho-dilator impulses leaves the bronchial movements unaffected. A further point against this theory is that made against the previous one—the excessively high rate of smooth muscle contraction.

The third hypothesis was investigated in two ways. An isolated lung preparation was suspended in a Drinker respirator and a record from the right bronchus taken in the usual way while the lungs were regularly inflated and deflated. Such a record was indistinguishable from those obtained in the normal way, showing that it is possible to reproduce the movements mechanically. In another series of experiments bronchial movements were recorded as follows: (*a*) in the intact animal; (*b*) after resection of a large portion of the right thoracic wall and bilateral phrenicectomy; (*c*) after right and then bilateral vagotomy; and finally (*d*) after section of the spinal cord at the level of the occipito-atlantal space. The animal is kept alive after the last procedure by a special method of artificial respiration of the left lung. It was seen that each operation reduced the amount of movement of the thoracic cage until it was rendered motionless, and the bronchial movements were reduced in amplitude proportionately. The same result was obtained by dividing the vagi and spinal cord first of all. In this case the thorax became motionless and the bronchial movements ceased, and the tracings were unaltered by subsequent resection of the chest wall. The rapid bronchial rhythm was thus seen to be an exact counterpart of that of the thoracic cage and to be extrinsic. The reflex arc initiated by the stretch receptors in the bronchial muscle is therefore not concerned with rhythmic bronchial movements, but may assist in the control of respiratory movements.

CONCLUSION

The bronchial muscle is concerned entirely with the maintenance of a moderate tone, and there seems to be no rapid, rhythmic function assignable to it. The larger bronchi are able to resist changes of shape, especially compression, imposed upon them by the respiratory movements of the thorax because of the plaques of cartilage in their walls. In the unsupported smaller bronchi, the muscle forms a relatively larger proportion of the wall, and, by its tone, prevents the expiratory movements from occluding the lumen of the tubes. Its anatomical arrangement is admirably designed for this purpose. The above discussion is based upon experiments on the larger bronchi, and the behaviour of the smaller ones is deduced by analogy. Such an assumption is not unreasonable, as the bronchial muscle is a continuous network with the same nerve-supply throughout and can reasonably be expected to behave as a unit. The total capacity of all the bronchioles is large, and, as the calibre of these tubes is governed by the muscle in their walls (which also controls the openings into the air sacs), it can easily be realised that small changes in the tone of this muscle can lead to considerable alteration in the volume of respired air. Therefore, in spasmodic bronchial disease it is not necessary to postulate an active contraction of the bronchial muscle—a small increase in tone will produce far-reaching effects. It is important both to appreciate this and to know the circumstances in which it can occur, some of which have been described in this paper.

SUMMARY

(1) The anatomy of the bronchial tree with special reference to the myo-elastic layer is described.

(2) Theoretical considerations of its function are briefly discussed.

(3) A method of directly recording changes in the calibre of the bronchi in the dog is described.

(4) It is shown, using this method, that the tubes are in a state of constant tone which sometimes undergoes slow, rhythmic variations.

(5) The tone is reflexly modified from many sites both within and outside the respiratory system.

(6) Rhythmic changes in calibre of the bronchi synchronous with respiratory movements are demonstrated. Investigation of their mechanism shows that they are produced passively by the respiratory thoracic movements.

(7) The relationship of asthma and other spasmodic bronchial diseases to these experimental findings is indicated.

By kind permission, Figs. 2, 3, and 5 are reproduced from the *Journal of Physiology*, 1935, **84**, 225; Figs. 7 and 8 from the same journal, 1936, **87**, 298; and Fig. 4 from the *Proceedings of the Royal Society of Medicine*, 1936, **29**, 527.

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BIRMINGHAM HOSPITALS CONTRIBUTORY ASSOCIATION.—Mr. Robert Bernays, M.P., parliamentary secretary to the Ministry of Health, addressing the annual meeting of this association last week, said that in the ten years of its existence it had collected and distributed a sum not very far short of 3 million pounds. The hospital savings movement had done as much as any single factor to secure the strong position the voluntary hospitals occupied to-day. It provided an organised system of insurance and the profits went, not to shareholders, but to persons who were unable to pay even the small weekly contributions which the associations collected. It was furthermore a valuable link between the voluntary and the municipal hospitals.

GOUT *

By Leslie C. Hill, M.D. Birm., M.R.C.P. Lond.

PHYSICIAN TO THE DEVONSHIRE ROYAL HOSPITAL AND TO THE BUXTON CLINIC FOR RHEUMATISM

To attempt here to review the whole problem of gout would be virtually impossible. I will therefore make a critical survey of 93 cases of gout treated during the last three years, rather more than half of which were under my own care, with the object of establishing, at any rate to my own satisfaction, the relative importance of factors in the clinical history, physical examination, and biochemical investigations, which together form a composite picture of gout. On the basis of these findings I hope that it may be possible to throw some light upon the existence of abarticular gout.

Ætiology

The study of contemporary publications reveals a great divergence of opinion in the matter of the relative frequency of gout to-day, and this variability is also evident in the statistics published during the last 50 years. The Devonshire Royal Hospital records since 1886 (Table I) exemplify this point very clearly.

TABLE I—INFLUENCE OF STAFF CHANGES AND THE INTRODUCTION OF BLOOD URIC ACID ESTIMATION ON THE NUMBER OF GOUT CASES ADMITTED TO THE DEVONSHIRE ROYAL HOSPITAL

Period.	Total cases admitted.	Gout cases. M. — F.	Percentage of total.
1886–1890	12,114	.. 158 ..	1·3
1891–1895	12,497	.. 400 ..	3·2
1896–1900	14,224	324 .. 20	2·4
Five new appts. to staff.			
1901–1905	15,836	743 .. 91	5·26
1906–1910	18,019	511 .. 62	3·18
1911–1915	20,702	784 .. 120	4·36
1916–1920	21,557	722 .. 362	5·0
Six new appts.			
1921–1925	17,829	408 .. 213	3·48
Blood uric acid estm. introduced.			
1926–1930	19,219	392 .. 121	2·66
1931–1935	18,833	427 .. 94	2·76

M. = males; F. = females.

INCIDENCE

A considerable rise in the number of cases of gout is noticeable from 1900 onwards until about 1920, to be followed by a slight fall. During 1916–20 as many as 5 per cent. of the patients admitted were regarded as suffering from gout, and over a third of these were women—most of us who have had experience of the disease would be sceptical of this high proportion in women. Further investigation revealed an interesting relationship between variations in the percentage of gout and appointments to the honorary staff. Thus about 1900 a big change occurred, five new appointments being made. Similarly round about 1920, when the number of cases of gout began to fall, another big staff turn-over occurred, on this occasion six new members being added. It seems probable from the records that the high percentage of gout in women during 1900–25 may have been influenced by a tendency on the part of one or two members of the staff at that time to diagnose as gout cases of chronic villous synovitis of the knees in women, so common at or round about the menopause as to be occasionally designated hypoglandular or menopausal arthritis. The third important factor influencing the figures was the introduction of the blood uric acid estimation in 1923.

From this brief review it is possible to appreciate the danger of accepting statistics and the desirability of establishing more clear-cut standards for diagnosis in this disease.

TABLE II—HEREDITY

All cases.	Women (21).	Men (72).	Total (93).	Per cent.
Family history of gout	11	30	41	45
Family history of fibrositis ..	4	10	14	15
No family history	5	32	37	40
Abarticular.	**Women (5).**	**Men (10).**	**Total (15).**	**Per cent.**
Family history of gout	3	6	9	60
Family history of fibrositis ..	1	2	3	20
No family history	1	2	3	20
Mixed.	**Women (4).**	**Men (17).**	**Total (21).**	**Per cent.**
Family history of gout	3	6	9	42·8
Family history of fibrositis ..	1	3	4	19·0
No family history	0	8	8	38·0

HEREDITY

In no condition is the importance of heredity more stressed than in gout. Heine has particularly emphasised the hereditary nature of the disease and quotes families in which it has appeared as a dominant characteristic for 400 years. Many writers, including Llewellyn, consider that an hereditary factor is invariably present. The fact that the morbid potentialities may remain latent for a generation probably accounts for the absence of a family history in many of the cases. There is a family history of gout in 45 per cent. of my cases and of fibrositis in a further 15 per cent. (Table II). The percentage was higher, but not significantly so, in the women.

These figures are somewhat lower than those quoted by such authorities as Garrod, Roberts, and Luff, but theirs related to private patients, while the majority of mine are of the hospital type in whom reliable history is more difficult to obtain. The inherited predisposition may be in the nature of a transmitted allergic state. Neither by observation nor by questionnaire have I observed any abnormal tendency to allergic manifestations among these patients; but this is merely an impression.

TABLE III—OCCUPATION OF 72 MEN SUFFERING FROM GOUT

Painters	2	Shopkeepers	4
Labourers	10	Factory hands ..	14
Miners	6	Business and professional men	15
Publicans	7		
Clerks	7	Others	7

OCCUPATION

No one particular occupation stood out prominently in association with gout (Table III). The

* Delivered before the International Congress on Rheumatic Diseases, Bath, on April 2nd.

relatively high percentage in publicans supports the orthodox attitude towards excessive alcoholic intake. The figure of 6 miners affected may be considered low in relation to the 500 odd who are treated annually in the Devonshire Royal Hospital. The free sweating set up by heavy manual work in a warm atmosphere with promotion of free circulation may explain the relative infrequency of gout in this occupation.

TABLE IV—AGE OF ONSET

—	Men.			Women.		
	All cases (72).	Abarticular (10).	Mixed (17).	All cases (21).	Abarticular (5).	Mixed (4).
Below 25	2	—	—	2	—	—
25–35	6	3	2	1	—	—
35–45	24	4	3	6	1	1
Above 45	40	3	12	12	4	3

AGE

Gout is essentially a disease of the middle and declining years of life (Table IV). There is no example in this series—and I have never met one in practice—of classical gout before the age of puberty. Many, however, have been reported, including an account by Garrod of 2 girls both under 10. Only 3 women in my series showed symptoms before the menopause, and of these, 2 of the classical type were associated with advanced renal disease. One was an example of generalised tophaceous gout, rare nowadays even in men. In 2 patients the acute attacks coincided with the menstrual periods. In the male series 2 cases began before 25 years, 6 before 35, and 32 before 45. So that in considerably more than half of the cases the disease began after 45; if the figures for the women are included, the proportion is still higher.

TOPHI

The presence of tophi is widely regarded as unequivocal evidence of gout. They are said to be more common in men than women, particularly the multiple variety.

TABLE V—PRESENCE OF TOPHI IN 40 CASES OUT OF 93 (43 PER CENT.)

Site.	Men (32).	Women (8).	Total (40).	Per cent.
Ears	30	5	35	87·5
Olecranon ..	4	3	7	17·5
Fingers ..	3	2	5	12·5
Toes	3	1	4	10·0
Eyes	3	1	4	10·0

Tophi in various situations (Table V) were found in 32 men and 8 women. The helix of the ear was the commonest situation; others included the posterior surface of the pinna, the olecranon bursa, eyelid, conjunctiva, fingers, and toes. In 2 men acute attacks occurred in the ear which became intensely congested, swollen, and bright red in colour; instead of pain, a sensation of burning and irritation were complained of and insect bite was suspected before the true diagnosis was appreciated. In one instance where no previous deposit had been noted in that region, a tophus was found after the attack, while the other was followed immediately by a classical outburst in the great toe.

From my figures I am unable to agree with those authorities who state that tophi are relatively very uncommon in women.

Diagnosis and Grouping

The cases have been grouped under three headings: articular, abarticular, and mixed gout (Table VI). Further subdivision into acute and chronic articular gout would have postulated a purely arbitrary standard.

The articular group contains the typical outbursts in the great toe, the less common varieties which start in the larger joints (knees, elbows, &c.), and the rarer polyarticular manifestations so liable to be confused with rheumatoid arthritis. Apart from the classical attacks in the great toe the commonest sites are foot, hand, knee, elbow, shoulder, hip—in that order. Until recently I had been reluctant to diagnose gout in the presence of bilateral swellings of the small joints of the fingers (perhaps with spindling) even when the course of the disease, a positive response to colchicum, and a raised blood uric acid suggested it, and even when a complete recovery followed treatment—an important point in diagnosis. I had the privilege recently of seeing, in Prof. F. J. Lang's laboratory at Innsbruck, microscopical slides of joints showing pathological changes hitherto regarded as typical of rheumatoid arthritis—synovial proliferation with granulation and pannus formation—associated with a heavy deposit of sodium biurate in the cartilage and synovial fringes.

TABLE VI—DIAGNOSIS

—	Men.	Women.	Total.	Per cent.
Articular gout	45	12	57	61·2
Classical	21	4	25	
Various joints ..	22	5	27	
Rheumatoid	2	3	5	
Abarticular gout ..	10	5	15	16·1
Mixed gout	17	4	21	22·5
Associated with nephritis	5	4	9	9·6

In this series there were 5 examples of this type closely resembling rheumatoid arthritis. Possibly on close examination the spindling is not so well marked and the tendency to wasting of the small muscles and ulnar deviation is lacking. Of the patients 3 were women, and in view of the relatively small numbers it would be unwise to do more than suggest that this rare manifestation of gout is commoner in women than in men and may be associated with some particular occupational strain.

The 15 cases of abarticular gout, of which more will be said later, are virtually all examples of gouty fibrositis and neuritis. I have had no opportunity of studying the effects of gout on other systems—cardiovascular, digestive, ocular, &c.—since such cases did not present themselves in my private or hospital practice. This figure of 15 is small in comparison with the number of cases of fibrositis treated each year (1200 in 1935–36) in the Devonshire Royal Hospital.

RENAL FACTOR

In a small series of 10 consecutive cases of gout the renal function was carefully estimated.

In only 1 case was there any evidence of deficiency and this was too small to be significant since the patient was well advanced in years and had other evidence of arterio-sclerosis. In 9 cases (5 men, 4 women) out of the total of 93, nephritis with seriou

renal inefficiency was noted. Albuminuria, casts, nitrogen retention, and a standard clearance of less than 18 (35 per cent. of normal) were required for this diagnosis. The attacks in these patients differed in no way from the others, the response to colchicum and hydrotherapy being equally satisfactory.

Unfortunately I have had no opportunity of confirming or rejecting Llewellyn's statement that tophi are never found in chronic nephritis in the absence of clinical gout.

ONSET OF ATTACKS

Not every attack is as dramatically sudden and clear-cut as that described by Sydenham. Without precise data I have an impression that in more than half of the male cases the onset was sudden, whereas in women the reverse obtained, gradual onset being more common. Table VII shows the overwhelming

TABLE VII

	ONSET OF INITIAL ATTACK					ONSET OF SUBSEQUENT ATTACKS				
All cases.	Men (63).	Wom. (17).	Total (80).	Per cent	All cases.	Men (63).	Wom. (18).	Total (81).	Per cent
Day	11	2	13	16·2	Day	15	2	17	20·9
Night	52	15	67	83·7	Night	44	10	54	66·6
					Day & night	4	6	10	12·3
Abarticular.	Men (9).	Wom. (5).	Total (14).	Per cent	Abarticular.	Men (9).	Wom. (5).	Total (14).	Per cent
Day	2	—	2	14·2	Day	4	—	4	28·5
Night	7	5	12	85·7	Night	4	2	6	42·8
					Day & night	1	3	4	28·5
Mixed.	Men (11).	Wom. (4).	Total (15).	Per cent	Mixed.	Men (11).	Wom. (4).	Total (15).	Per cent
Day	5	—	5	33·3	Day	6	—	6	40·0
Night	6	4	10	66·6	Night	4	3	7	46·6
					Day & night	1	1	2	13·3

tendency for the initial attack to occur at night both in men and women. This was the case in 66 patients out of 79 from whom a definite history could be obtained. In subsequent attacks the incidence at night was not so great.

There are two theories to explain this nocturnal tendency. The first suggests that slowing of the circulation during the night favours precipitation of urates in the cartilage by way of the epiphysis; the second explains it on the basis of an increased vagotonia and slight alkalosis. There is some experimental evidence to show that vagal stimulation increases renal permeability to uric acid, and vagal tone is always increased at night. As I shall hope to show later, my figures fail to reveal any such alkalosis in a single case, and I have been unable to obtain any very convincing evidence of this raised vagal tone, so that I am disinclined to accept this theory. Since uratic deposits are heaviest in the superficial layers of the joint cartilage and since the hypertrophied synovial membrane is often encrusted with urates, it is probable that such deposits take place from a synovial fluid in which the concentration of uric acid may be significantly greater than it is in the blood. Similar conditions may obtain in tendons, tendon sheaths, bursæ, &c.

SEASON

The seasonal tendency was noted (Table VIII) in 60 men and 14 women from whom a satisfactory history could be obtained. Spring is by far the commonest season for acute attacks, autumn being a rather poor second. This is in strict accordance with accepted ideas.

TABLE VIII—SEASONAL INCIDENCE OF ATTACKS OF GOUT

All cases.	Men (62).	Wom. (19).	Total (81).	Per cent.
Spring	24	7	31	38·0
Summer	4	2	6	7·4
Autumn	11	5	16	19·7
Winter	6	3	9	11·0
Spring and autumn	14	2	16	19·7
Spring and winter	3	—	3	3·7
Abarticular and mixed.	**Men (19).**	**Women (8).**	**Total (27).**	**Per cent.**
Spring	13	3	16	59·2
Summer	2	—	2	7·0
Autumn	1	4	5	18·0
Winter	1	—	1	3·7
Spring and autumn	2	1	3	11·0

BIOCHEMICAL TESTS

Sedimentation-rate.—Tests were carried out by the centrifuge tube method, which in our hands has proved more correct and more constant than any other. The figures (Table IX) show the level at the end of one hour expressed as a percentage. Acute, subacute, chronic, and latent stages are represented and the figures in consequence have no absolute value. It will be noted, however, that in more than a half the level was above 70 per cent. This contrasts with a group of 50 cases of rheumatoid arthritis examined recently in rotation in which the average was between 50 per cent. and 55 per cent. In many cases the lower levels were found during the acute stage. The figures thus support my own impression of an increased rate during the acute attack, and a rapid return to normal with recovery. Later, in the more chronic stages, there is not the same tendency for a return to normal. A rapid improvement in the sedimentation-rate suggests the possibility of either gout or subacute rheumatism and warrants a confirmatory blood uric acid estimation.

TABLE IX—BLOOD SEDIMENTATION-RATE
(Centrifuge tube method, 1 hour reading)

All cases.	Men (65).	Women (19).	Total (84).
Below 50%	4	4	8
50–70%	23	10	33
Above 70%	38	5	43
Abarticular.	**Men (12).**	**Women (4).**	**Total (16).**
Below 50%	2	—	2
50–70%	3	1	4
Above 70%	7	3	10
Mixed.	**Men (16).**	**Women (4).**	**Total (20).**
Below 50%	—	—	—
50–70%	6	3	9
Above 70%	10	1	11

Blood uric acid estimation.—This was carried out by the Folin direct method except in a few cases. In about 90 per cent. of the cases the level was 4·5 mg. per 100 c.cm. or over (Table X). I regard as definitely abnormal any figure above 4·0 mg. in men or 3·75 mg. in women and anything within 0·25 mg. of these figures as suspicious. I am not prepared to diagnose gout

in the absence of tophi where the blood uric acid by the Folin direct method is below these levels. No constant relationship between the blood uric acid and the stage of the attack is evident, but several cases showed a fairly rapid fall at the termination of the acute stage. Again, no constant relationship between the sedimentation-rate and the blood uric acid level could be demonstrated.

Blood-urea.—Apart from the 9 cases in which frank nephritis was present the blood-urea was found within normal limits. There does appear, however,

TABLE X—BLOOD URIC ACID

(Folin method)

—	Men (70).	Women (21).	Total (91).
All cases—			
Above 5·5 mg./100 c.cm.	27	4	31
4·5–5·5 "	37	16	53
Below 4·5 "	6	1	7
Abarticular—			
Above 5·5 "	1	—	1
4·5–5·5 "	10	5	15
Below 4·5 "	—	—	—
Mixed—			
Above 5·5 "	6	—	6
4·5–5·5 "	11	4	15
Below 4·5 "	1	—	1

to be a tendency for it to rise in cases of established gout with the passage of years. This is consistent with what one would expect from the effects of gout in hastening coronary as well as arterial sclerosis.

Calcium and pH content of the blood in 130 consecutive cases of gout were investigated. The *p*H was found to be within normal limits in 125, was slightly lowered in 4, and only raised in 1. This throws doubt upon the theory of alkalosis and consequently upon the vagotonia that is supposed in part to result from it. The calcium content was also normal in 25 out of 28 cases. In 2 it was a little lower during the acute stage, while in 1 it was slightly raised. That the patient was an old man with advanced atheroma and hypertension may explain this.

ASSOCIATION WITH THE MENSES AND WITH GLYCOSURIA

It has been frequently stated that the menstrual periods have an inhibitory effect upon gout. In 2 of the only 3 women in whom gout developed before the climacteric the attacks were found to coincide with the beginning of the periods. One patient, in whom the gout was apparently secondary to nephritis, had an acute attack every month while she was last under observation.

The association of gout with glycosuria has been conspicuous by its absence in this series of 93 patients. This may be due to the preponderance of the hospital class as compared with the self-indulgent, overweight type in whom the glycosuria probably represents the unconsumed surplus of carbohydrate excess. In a recent paper Violle also comments on the rarity of the association in France and considers the incidence to be less than 1 per cent. even at the spas. The statistics of Umber suggest that the association is commoner in Germany. He had 15 diabetics, all of a mild type, in a series of 278 cases of gout.

Abarticular, Mixed, and Irregular Gout

It is in the diagnosis of abarticular and irregular manifestations of gout that the greatest uncertainty and confusion prevails. Among the irregular varieties of articular gout, those simulating rheumatoid and osteo-arthritis are the most interesting and difficult. Each of the 5 cases (3 women, 2 men) of the polyarticular type closely resembled rheumatoid arthritis, but each ran a gouty rather than a rheumatoid course and showed those clinical characteristics which in association with a raised blood uric acid constitute a picture of gout. In 3 of the 5 cases colchicum was found beneficial in the acute attacks. Even so, I should have been reluctant to diagnose gout in these cases had I not seen Prof. Lang's perfect illustrations of typical rheumatoid joints side by side with microscopic sections confirming the rheumatoid intra-articular features with unmistakable uratic deposits in the cartilage and synovial fringes. But I am convinced that the number of such cases is small. They may be suspected whenever great clinical improvement and rapid rise in the suspension stability follows treatment of almost any kind. I have personally encountered no cases of typical hypertrophic osteo-arthritis which appeared to have a gouty basis either clinically or biochemically.

According to many authorities hardly any portion of the body remains immune to the ravages of gout.

DIGESTIVE SYSTEM

Virtually every form of gastric, hepatic, and colonic derangement has been attributed to gout. The sensation of weight and oppression in the epigastrium is frequently complained of during the period immediately preceding an acute attack and may be explained on the basis of a mild toxæmia or hepatic congestion. On a few occasions a history of diarrhœa during the attacks has been obtained.

CARDIOVASCULAR SYSTEM

There is fairly general agreement with Huchard's famous aphorism that gout is to the arteries what rheumatism is to the heart, and recently I was interested to hear a prominent cardiologist class gout as only secondary to syphilis as a cause of arterial degeneration, including coronary sclerosis. The various abnormalities of rhythm—bradycardia, partial heart-block, &c.—and anginal pain which have been by some attributed to gout are surely only expressions of myocardial ischæmia following coronary sclerosis and are therefore not true manifestations of gout.

NERVOUS SYSTEM

I have seen 2 cases of trigeminal neuralgia—one is included in this series—in association with a raised blood uric acid, both of which were improved by treatment with Atophan and colchicum when all else had failed. The cases of sciatica met with have always appeared to be secondary to lumbosacral or gluteal fibrositis and have been considered under that heading.

OCULAR SYSTEM

Jonathan Hutchinson described a series of cases of iritis with rather unusual characteristics which he ascribed to gout. The special features of these attacks were the sudden onset (always at night), the sensation of heat and burning rather than pain, the intensity of the injection, and the relatively short duration. Wood has recently described four cases which correspond exactly to Hutchinson's description. In one of them acicular crystals observed in sheaves by the slit-lamp were confirmed by excision. Proof of gout in these cases depended upon the unusual clinical picture as compared with ordinary acute iritis, the presence of a raised blood uric acid, the presence of crystals in one case, and above all on the improvement which followed the elimination of existing excesses of food and drink.

SKIN

Pruritus and eczema are said to be common in gouty subjects and are undoubtedly often accompanied by a raised blood uric acid. The association has not been apparent in this series. I have not met a single case of psoriasis in combination with gout—and extremely few with rheumatoid arthritis—so that I am sceptical of any such connexion. Barber has described erythema of the palmar and plantar surfaces of the hands and feet and a hyperkeratosis at pressure sites, associated with fissuring. Brittleness of the nails with longitudinal fissuring has also been described. I have seen several instances of the hyperkeratosis and nail brittleness in this series and am satisfied that a connexion exists.

Conclusions

In this series of 93 cases of gout, 15 (10 men and 5 women) show a purely abarticular distribution and 21 (17 men, 4 women) show both articular and abarticular manifestations. In all but a single case the abarticular lesion was a fibrositis or a neuritis secondary to a fibrositis. The exception was a case of trigeminal neuralgia (associated with fibrositis elsewhere). Garrod particularly mentions the association of trigeminal neuralgia with gout. In this patient no form of treatment was of any value until, on finding the blood uric acid raised, atophan, colchicum, and diet regulation were instituted with dramatic success.

Analysis of the histories reveals the same clinical and pathological peculiarities in both classes of case. The hereditary factor is equally strongly marked; in point of fact the percentage is slightly higher. The age-incidence is about the same. It is interesting that the only woman who developed abarticular gout before the menopause was one of the two examples of acute attacks coinciding with the menstrual periods. Tophi were found in about the same proportion of cases (the numbers are too small to do more than create an impression). In Tables VII and VIII will be seen the same predilection for the spring, with autumn again second, and the same strong tendency for the initial attack to occur at night. This is not so evident in the case of subsequent attacks. The sedimentation-rate and the blood uric acid follow very closely the levels found in the whole series.

We have thus a series of cases with the same ætiological characteristics as typical gout, including a strong family history, predilection for particular season of the year, and tendency for the initial attack to occur at night. The resemblance continues in the clinical history, in the course of the disease, in the biochemical findings, and in the response to specific remedies.

They present the usual fibrositic characteristics, muscular tenderness, thickening, presence of nodules—trapezii, along the iliac crests, gluteal regions, lumbar muscles—stiffness in the fingers with periarticular thickening and tenderness. The pain is usually more acute and, as is stated above, usually comes on in bed at night when the patient is asleep. These symptoms may also be associated with transient swellings of the hands or feet without the heat and redness usually found in true gout, but associated with a sensation of heat or burning.

Unfortunately in only 8 of the 15 cases was it possible to try the effect of colchicum in the acute attack, and in 7 a rapid relief was obtained.

From the above it is reasonable to suppose that we are dealing with true manifestations of gout and not with fibrositis occurring in a potentially gouty subject. Only 15 cases have been diagnosed during the period under review out of somewhere between 800 and 1200 cases of fibrositis reviewed, so that gout would not appear to be as common a cause of fibrositis as many of the authorities suggest. It is not denied that the diagnosis may have been missed in many instances and several borderline cases were deliberately omitted.

Summary

1. Devonshire Royal Hospital statistics during the last 50 years suggest that variations in the incidence of gout may depend upon fundamental differences in the views of physicians as to what constitutes the gouty state, and demonstrate the need for more precise standards of diagnosis.

2. A family history of gout was obtained in about half of the 93 cases reviewed in this series, including those that appear to be secondary to nephritis. The higher percentages quoted in the past may be due to the fact that the term "gout" was often used by the laity to include any form of rheumatism. In the 93 cases under review no abnormal tendency to allergic manifestations was elicited.

3. Nothing definite emerged from the figures to implicate any particular occupation. The number of publicans was relatively high, while the miners affected were few in comparison with the great number treated over the same period.

4. Gout in its typical form is essentially a disease of the fourth decade onwards. There is a strong suggestion that a high proportion of those cases of gout which occur in young people are secondary to nephritis.

5. Far from being, according to Llewellyn and others, a protective against gout, the menstrual periods, from such evidence as we have in the few cases occurring before the menopause, actually appear to coincide with attacks.

6. Tophi were present in about half the cases, and there seems no justification for stressing the rarity in women. Two acute attacks of gout in the ear associated with tophus formation have been described.

7. The cases have been grouped under three headings—articular, including classical, oligo- and poly-articular gout; abarticular, associated mainly with fibrositis and neuritis; and mixed gout. Five cases of the polyarticular, rheumatoid type are included and their characteristics described.

8. There is no evidence on which to base a renal theory of origin for gout as a whole. In only 9 cases was gout apparently secondary to nephritis, and no difference either in the clinical history, course, or response to treatment was observed in these cases.

9. The tendency for the initial attack to occur at night is clearly established. Subsequent attacks are also more frequent at night than in the day, but the predilection is not so great. The circulatory theory offers a more satisfactory explanation for this than does the vagotonic theory. No evidence of a permanently heightened vagal tone nor of its precursor the raised pH of the blood could be demonstrated.

10. Spring is clearly the season of choice for gout, autumn being the next most common.

11. The sedimentation-rate varies considerably but on the whole is not greatly increased except during an acute attack. The rapid return to normal which follows clinical improvement is a characteristic feature. This is especially true in the early stages.

12. In the great majority of cases the blood uric acid is constantly raised above normal limits. In a proportion of cases the acute attack is immediately

preceded by a rise in the blood uric acid and a fall in the suspension stability, with a rapid reversal of this process on recovery.

13. There is no essential abnormality of the blood-urea in gout.

14. In a series of 130 consecutive cases the *p*H of the blood was found to be normal in 126 and slightly reduced in 4. These findings give no support to a theory of alkalosis as a basis for a hypothetical vagotonia.

15. The calcium content of the serum was normal in 25 out of 28 consecutive cases of gout. In 2 it was slightly lowered during acute attacks.

16. There was no evidence of any common association of glycosuria with gout.

17. Since the group of abarticular and mixed gout showed the same ætiological, clinical, and biochemical features and the same therapeutic response as the more classical varieties, there appears to be no reason to deny a gouty basis for the fibrositis seen in these cases. The number of such cases, however, appears to be relatively small.

"ALCOHOLIC" BERI-BERI

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It has long been recognised that alcoholic polyneuritis bears a close clinical resemblance to the so-called "dry" form of beri-beri. In recent years the idea has gained ground that this resemblance is more than fortuitous, and that in both diseases there is a common antecedent deficiency of vitamin B. Certain theoretical considerations advanced by Shattuck (1928) have led to an expansion of this concept to embrace a variety of gastro-intestinal abnormalities in which polyneuritis may occur—such as gastric carcinoma, chronic intestinal obstruction, and ulcerative colitis—and to include all such forms of polyneuritis under the term *secondary* beri-beri. Chronic alcoholic addiction remains the most important single precursor of this form of vitamin-B deficiency. Much work has been done, particularly in America, to confirm and elaborate this interesting hypothesis, which may now be regarded as reasonably well established (Minot, Strauss, and Cobb 1933, Blankenhorn and Spies 1935, Jolliffe and Colbert 1936, Jolliffe, Colbert, and Joffe 1936).

Beri-beri, as it is met with among rice-eating populations, gives rise in a proportion of cases to certain well-recognised, and not infrequently fatal, cardiovascular disturbances. One might reasonably anticipate that similar disturbances would be found among the cases of secondary beri-beri such as we have been considering, but from a study of the available records it appears that these symptoms are distinctly rare. Weiss and Wilkins (1936), however, have recently reported a series of such cases, arising mainly in alcoholics, several of which displayed quite severe cardiac failure, and these authors make the further claim that minor degrees of circulatory disturbance due to vitamin-B deficiency are far commoner than is generally realised.

The case of cardiac failure with polyneuritis in an alcoholic addict here recorded is very similar to those in the acute group described by Weiss and Wilkins. It is hoped to demonstrate that these cases bear a sufficiently close resemblance to "wet" beri-beri of the orient to warrant the belief that they share with it a common pathogenesis. The term "alcoholic" beri-beri seems an appropriate and convenient title for the condition.

CASE REPORT

A newspaper roundsman, aged 36, was admitted to Southmead Hospital, Bristol, on Jan. 3rd, 1937, with the following history.

For several months he had been breathless on exertion and had felt generally unwell. He tired easily, his appetite was poor, and he had lost weight. For the past three months he had complained of a dull pain in the upper abdomen and lower part of the chest, worse when carrying newspapers around. These symptoms had all become more severe during the week immediately prior to admission. Breathlessness had been particularly noticeable and his legs had started to swell. He had also suffered from a new, stabbing pain in the precordial area and at the lower end of the sternum, especially on coughing or breathing deeply.

Dietetic history.—He lived alone in lodgings, and was always very irregular with meals. He rarely ate anything at midday and his diet for the rest of the day appears to have consisted mainly of white bread and butter and tea. He ate a small amount of fat meat once a week. On two or three evenings a week he had a portion of fried fish at a local restaurant which, by his special request, was always cooked for him without batter. He ate very little vegetables or fruit, no eggs, and drank milk only in the summer time when his news round took him out to a dairy. For several years he had been in the habit of drinking 3–5 pints of beer a day. As a rule he indulged only occasionally in spirits, but during the Christmas season which had just concluded, his increasingly ill appearance had made him the object of much well-meaning generosity in this respect. For the last fortnight he had had an almost complete loss of appetite, and appeared to have subsisted on little else but alcohol.

It is evident that the above diet is grossly defective in many essential components including vitamins, particularly vitamin B. White bread and fat meat are practically devoid of this vitamin while fish is to be regarded as a poor source at best. Incidentally it may not be generally realised that the average fried fish vendor cooks his fish in oil at temperatures approaching, or even exceeding, 200° C. Batter, which swells up in contact with hot oil, may provide a certain protective coating but without it the survival of the comparatively heat-labile vitamin B_1 is distinctly problematical. The vitamin-B content of beer is of some interest and has recently been studied by Donovan and Hanke (1936) who demonstrated that most samples of commercial beer contain very little. From their findings it may be calculated that an adult would need to consume something over 20 pints of beer a day in order to obtain a maintenance dose!

On examination the patient was gravely ill and showed all the signs of severe congestive heart failure, with orthopnœa, distended neck veins, a tender liver palpable at the level of the umbilicus, and pitting œdema of the legs and lumbar area. The temperature was 100·2° F. The face looked slightly puffy, the tongue was furred, and there was cyanosis of the lips and extremities. Arterial pulsation was visible in the neck. The heart was rapid (120 per min.) but regular. The apex-beat was palpable in the nipple line, but the area of cardiac dullness extended for an inch beyond this. On auscultation, a triple rhythm was detected at the apex but no murmur. Blood pressure 115/65 mm. Hg. No thickening of peripheral vessels was noted and no retinal changes. A moderate number of mois

sounds were present in the chest together with scattered rhonchi. Urine: scanty and high coloured; albumin was present together with fairly numerous hyaline casts and occasional leucocytes, but no red cells. Nervous system: no gross changes were found at this stage, but there was tenderness of the triceps and calf muscles; tendon reflexes were present.

Progress.—It was evident at the outset that this was a case of acute heart failure without obvious organic cause. After three days of complete rest with restricted fluids and an intramuscular injection of Salyrgan some improvement was noted. The temperature fell to normal on the third day, respiratory distress and cyanosis were less pronounced and the apical third sound had disappeared, but the other signs of severe congestion remained. By this time the rather remarkable dietetic history recorded above had been pieced together and the possibility of an acute heart failure of the type found in beri-beri was considered. With this in view he was given as nutritious a diet as possible, supplemented with large amounts of Marmite and Bemax. Further injections of Salyrgan were given on alternate days. At the end of a week very striking improvement had taken place. The patient was now breathing easily, there was no cyanosis and very little œdema. The blood pressure was 130/80 and the pulse-rate between 80 and 90 per minute. A rapid shrinkage of the engorged liver had occurred and at this time barely two fingers-breadth was palpable. There had been a brisk diuresis. Progress continued with a healthy return of appetite and three weeks after admission the liver edge could no longer be felt, and beyond a certain nervous excitability of the heart rate no cardiovascular abnormality could be detected by ordinary examination. Blood pressure was now 130/85 mm. Hg.

Electrocardiograms taken on Jan. 5th and Feb. 14th are set out for comparison in Fig. 1. They display the unusual and perhaps diagnostic feature of an abnormally short period of conductivity coinciding with the acute stage of failure and subsequently lengthening.

Radiography.—A reduction in the size of the heart after recovery from the congestive failure may be seen in Fig. 2.

Nervous signs.—As already noted there was little demonstrable abnormality on admission beyond tenderness of certain muscle groups. This tenderness persisted and six days later he was found to have absent knee- and ankle-jerks. Biceps jerks were present but the triceps jerks were not obtained. Slight weakness of both calf muscles was noted and also of triceps on the left side. There was defective vibration sense below the knees on both sides with indefinite areas of anæsthesia to light touch on the feet. These signs persisted long after all evidences of cardiac failure had vanished. On Feb. 2nd, a month after admission, knee- and ankle-jerks were still absent and there was still tenderness of the calves. Vitamin-B concentrates by mouth were at this point supplemented by intramuscular injections of Betaxan in doses equivalent to 4 mg. of crystalline vitamin B_1 daily. Three weeks later deep pressure tenderness had gone and sluggish knee- and ankle-jerks were obtained. All signs in the central nervous system were finally normal three months after admission.

Additional investigations.—Wassermann reaction negative. Blood count (Jan. 27th): red cells, 5,160,000; hæmoglobin, 85 per cent.; colour-index, 0·8; white cells, 18,600; differential count normal. Fractional test-meal on three occasions showed absent free hydrochloric acid throughout, even after histamine injection. Renal function: the urine continued to contain a trace of albumin with occasional casts in the deposit for three months; excretion tests, however, showed good function. Weight: reckoning from the last known weight shortly before admission and prior to the appearance of œdema there was a calculated gain of nearly 30 lb. after three months' treatment in hospital.

At the time of writing and more than a year after admission the patient remains fit and well and free from any sign of cardiac or nervous disease.

DISCUSSION

It may be of assistance to refer at this point to the orthodox clinical picture of beri-beri, the cardiovascular features of which have been well described by Keefer (1930) and Wenckebach (1928, 1932, 1934). The two principal manifestations, already mentioned, are polyneuritis and circulatory disturbance. Patients with polyneuritis may show any gradation from slight muscular weakness, painful calves, and loss of tendon reflexes to widespread motor paralysis with varying degrees of hyperæsthesia and anæsthesia. The less common but more serious cardiac cases on the other hand are characterised by congestive heart failure with fatigue, breathlessness, precordial pain, and œdema as prominent symptoms. Many of these have abnormal arterial pulsation associated with a widened pulse pressure. Pistol-shot sounds on auscultation over major arteries can sometimes be heard or will become audible after an injection of adrenaline. This unusual response to adrenaline is a characteristic feature of the beri-beri heart and forms the basis of the adrenaline test of Aalsmeer (1934). Wenckebach considers this reaction to be of considerable importance in diagnosis. His theories of the underlying rationale of this test are of some moment and demand further brief reference. It is maintained that circulatory failure in beri-beri is both central and peripheral. The heart muscle is said to be the seat of a peculiar form of water retention seriously impairing its contractility, while the peripheral arterioles are dilated and respond to adrenaline by widening still further and so permitting a dangerously rapid onflow of blood from the arterial to the venous side of the vascular circuit. This collapse of peripheral resistance is reflected clinically in the wide pulse pressure and audible arterial bruit. Centrally, the already weakened right heart is overwhelmed by a venous flood-tide with which it is quite unable to cope, so that typical signs of congestive failure result.

It is to be presumed that the constant outpouring of the patient's own adrenaline will determine the onset of cardiac failure in a severe case. Any factor normally stimulating adrenaline secretion, such as undue muscular exertion, must obviously aggravate the situation and perhaps explains the relative frequency of cardiac symptoms among manual workers and, from another standpoint, their recognised rarity in cases developing early paralysis. One corollary to be drawn from this is the great therapeutic value of complete rest.

Two other important features that remain to be mentioned are the X ray and clinical evidences of cardiac enlargement affecting particularly the right chambers, and certain changes in the electrocardiogram. A reduction in heart size in the radiograms coinciding with recovery from the acute symptoms is of almost diagnostic importance, since it is admittedly difficult to demonstrate such a reduction in ordinary forms of congestive failure. Although in many cases the electrocardiogram is normal, various abnormalities have been described and include such changes as negative T waves, notched R and T waves, low voltage P waves, and Q R S complexes, all of which may of course occur in other conditions. A well-recognised although

apparently not very common finding in the ordinary classical beri-beri is a shortened conduction period that lengthens during recovery. Interest in this peculiar abnormality has become intensified as a result of a recent paper by Chopra, Chaudhuri, and De (1937a) reporting abnormally short P–R intervals in no less than 40 per cent. of cases of epidemic dropsy

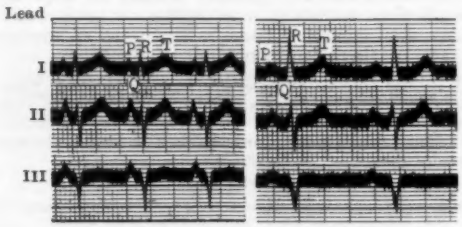

FIG. 1.—Electrocardiograms showing abnormally short period of conductivity in acute stage of failure, which gradually lengthened with treatment.

during the acute stage. These authors (1937b) have also demonstrated the very common occurrence of radiographic enlargement of the right side of the heart in this disease. It is not proposed to enter here into the ancient controversy as to the ætiological relationship between epidemic dropsy (a disease apparently confined to the Eastern provinces of India), and beri-beri in other parts of the world, but it is generally conceded that clinically there is a close relationship, and many competent observers maintain that epidemic dropsy is in fact merely a variant of beri-beri. For our purpose its importance lies in certain striking resemblances that its symptomatology bears to the case recorded above, particularly in the X ray and the electrocardiographic changes, in the rise of temperature at the onset, and in the preponderance of circulatory over nervous signs.

Although the Aalsmeer adrenaline test was unfortunately not performed in this case at a time when it might have been of value there is sufficient confirmatory evidence to establish the diagnosis of an acute beri-beri heart without it. It must of course be understood that the term "beri-beri heart" is here used in a wide sense to cover alcoholic and other forms of secondary beri-beri as well as such variants as epidemic dropsy, and without prejudice to any theory of ætiology. Reviewing all the facts it certainly seems difficult to offer any satisfactory alternative diagnosis.

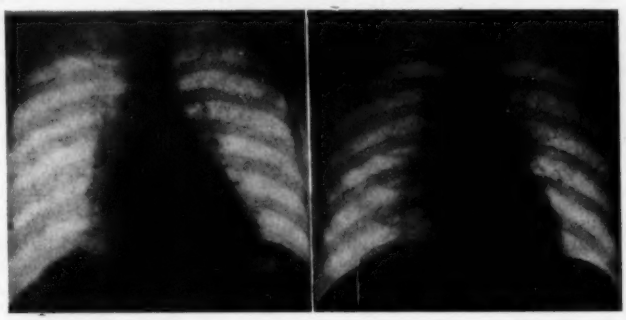

FIG. 2.—Radiograms of chest showing the decrease in the size of the heart during recovery. Note that this decrease affects particularly the right ventricle and auricle.

PATHOGENESIS

The assumption that deficiency of vitamin B_1 is the root cause of all forms of secondary beri-beri rests on clinical analogies with the endemic disease. It must be pointed out, however, that even in endemic beri-beri there may be other important contributory factors due to the multiple defects in the diet of rice-eating populations. For instance, protein deficiency, undoubtedly present in many beri-beri diets, is a recognised cause of œdema, while as Mellanby (1934) has shown, deficiency of vitamin A is a potential cause of nerve-cell degeneration. Assuming however that defect in vitamin B_1 is the most important factor in all forms of beri-beri it still remains to be explained why the chronic alcoholic addict is so especially prone to develop such a deficiency state.

This problem may be approached from more than one aspect. As in any deficiency state the ultimate tissue shortage may be due to (*a*) defective intake, (*b*) defective assimilation, (*c*) defective storage, and (*d*) increased tissue demand from an alteration in rate or type of metabolism. These will be considered in turn:—

Defective intake.—Inadequacy of vitamin B in the diet does not occupy the same pre-eminent position in the secondary beri-beris as it does in the primary endemic form. Nevertheless it will be readily apparent that the diet of the chronic alcoholic addict invariably exhibits inadequacies both in essential foodstuffs, such as fat and protein, and in vitamin B. The well-known anorexia of chronic alcoholism may be itself the direct result of vitamin-B deficiency. Thus there is an early tendency to the establishment of a vicious circle with an ever-increasing disparity between the intake of solid food compared with alcohol, although paradoxically enough the increased consumption of the latter may bring the total calorie value of the diet up to almost normal figures.

Defective assimilation.—This is probably the most important single factor in those cases of secondary beri-beri due to abnormalities of the gastro-intestinal tract. In some of these prolonged diarrhœa or vomiting is the immediate precursor, in others a defect in the absorptive capacity of the alimentary mucosa is to be presumed. To what extent defective absorption of vitamin B is concerned in alcoholic cases is an interesting speculation. The not uncommon achlorhydria has been cited as evidence of gastric defect. Minot, Strauss, and Cobb (1933) found achlorhydria in approximately half their cases of alcoholic polyneuritis. In a more recent series Joffe and Jolliffe (1937) discovered it in 29 per cent. and in 52 per cent. of alcoholic pellagrins. The persistent absence of gastric hydrochloric acid in the case reported above has already been noted. It is well known that achlorhydria figures in a variety of deficiency states, and it is not unreasonable to presume that its occurrence in alcoholic and other secondary forms of avitaminosis B implies some degree of defective absorption of this vitamin. Direct evidence in support of this conclusion is provided by the fact that curative doses of vitamin in all these cases is very much smaller parenterally than by mouth.

Defective storage.—Comparatively little is known about vitamin-B storage. The liver has been regarded as the probable site but it appears unlikely that any considerable amount is kept in reserve. No further discussion of this aspect will be entered upon but in passing it is worth noting that, as alcohol and certain associated toxins have a selective affinity for liver cells, fuller knowledge may well bring the factor of storage interference into greater prominence.

Increased tissue demand.—Cowgill (1935) has shown that the appearance of signs of vitamin-B_1 deficiency in dogs is accelerated when the metabolism is quickened by exercise, or by the administration of thyroid principle. He maintains that the vitamin-B_1 requirement of an individual is directly proportional not only to the total metabolism but also to the total calorie intake. Cowgill's findings however need to be re-examined in the light of more recent work by Peters and his collaborators (1936), who have shown that vitamin B_1 is specifically concerned in the later stages of the metabolism of carbohydrate and allied substances. There is at present no evidence that it is concerned in the metabolism of fat or the purely nitrogenous fraction of protein. From this it seems justifiable to conclude that the requirement of vitamin B_1 is greatest when carbohydrate is the chief source of energy supplied to the tissues, and least when fat is being mainly utilised for this purpose. In other words, fat may be said to exert a sparing action on vitamin-B_1 requirement, a conclusion supported by the clinical observation that a high fat diet will delay the appearance of deficiency signs. The characteristic wasting of vitamin-B deficiency states also finds an explanation here, if it can be assumed that the body draws on its own fat reserves in an attempt to confine carbohydrate combustion to an essential minimum. The exhaustion of the fat reserves immediately accentuates vitamin-B_1 shortage and precipitates, so to speak, a deficiency crisis. The advent of an acute infection might be expected to act in the same way by causing a sudden increase in metabolic rate.

It will be seen, therefore, that Cowgill's concept needs some modification. The vitamin-B_1 requirement of an individual depends not only on the *rate* but also on the *type* of tissue metabolism, and equally therefore, not only on the total calorie intake but also on the kind of calories ingested. A diet poor in fat and protein but rich in carbohydrate engenders a type of tissue combustion calling for increased supplies of vitamin B_1. The significance of this in relation to alcohol will be at once appreciated, for alcohol can replace carbohydrate as a source of fuel almost entirely. Moreover, although on account of their relatively high calorie value they increase the demand for this vitamin, most alcoholic beverages are themselves practically devoid of it. The fault lies not in the lack but in the unbalanced distribution of calories, together with the absence of that vitamin-B_1 complement necessary for their proper combustion.

SUMMARY

(1) The case is reported of a male subject, addicted to alcoholic excess, who was admitted to hospital with a severe congestive type of heart failure together with signs of polyneuritis and who recovered completely after treatment by rest, a high calorie diet, and large amounts of vitamin B.

(2) Clinical analogies with oriental beri-beri afford ground for the belief that this syndrome is a form of "secondary" beri-beri.

(3) Attention is drawn to certain clinical features which may be of value in diagnosis. These include reversible cardiac enlargement, shortening of the electrocardiographic conduction periods, and a positive Aalsmeer test due to the morbid sensitivity of the circulation to adrenaline.

(4) The multiple factors concerned in the evolution of alcoholic beri-beri include defects in diet and assimilation acting in conjunction with increased tissue requirement of vitamin B_1 due to an increase in rate, or alteration in type, of metabolism.

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PULMONARY ATRESIA AND HYPERTROPHY OF THE BRONCHIAL ARTERIES

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Pulmonary atresia is a rare congenital deformity of the heart, but it is of interest to consider how the individual may survive for a number of years in spite of the closure of this important channel to the lungs. In a few recorded instances the interventricular septum is intact. Such cases do not long survive birth. In them the venous blood passes to the left side through a patent interauricular septum and a mixture of venous and arterial blood reaches the lungs from the aorta through a patent ductus arteriosus. We omit these from the discussion.

The tetralogy of Fallot—pulmonary stenosis, patent interventricular septum, dextroposition of the aorta, and enlargement of the right ventricle—is the not uncommon type of cyanotic congenital cardiac disease that may allow fairly long life. Keith has pointed out how failure in the development in the infundibulum of the conus arteriosus, early in fœtal life, before the interventricular septum forms, leads to this group of abnormalities. This type of pulmonary stenosis is to be contrasted with the valvular variety, in which the pulmonary valves are fibrosed and fused, perhaps as the result of fœtal

endocarditis, at a later stage. In these hearts the pulmonary artery is often enlarged above the valves for some unknown reason. These patients are not cyanosed, necessarily, until quite late (cyanose tardive), in spite of an opening in the valves only the size, perhaps, of a lead pencil.

Some cases of pulmonary atresia seem to be extreme examples of Fallot's tetralogy. Those for discussion have, then, in addition, a patent interventricular septum, a dextroposed aorta, and some degree of right ventricular enlargement. In other recorded cases the ductus arteriosus remained open and allowed blood to reach the lungs. In all those to be discussed the ductus was closed.

CASE REPORTS

CASE 1.—A dental mechanic aged 33, who was blue since birth but was able to get about quietly and follow his occupation; he was never ill. He was of moderate build, thin, with pronounced clubbing of the fingers. His aspect was pallid, but very cyanosed, particularly in the hands, feet, and ears.

On admission to hospital he had right ventricular failure, precipitated by bronchitis, of which he died. Clinically the heart was much enlarged, to the right and to the left, with bulging of the precordium over it. The only signs on auscultation were a loud basal second sound and a vague diastolic murmur following it. There was definitely no systolic murmur or thrill.

Post mortem, the heart was globular, weighing 896 g. The right auricle was distended. The right ventricle was larger than the left, which was itself enlarged, with thick muscular walls. Between the ventricles was a hole about 2·5 cm. across, over which sat the aorta. This was 65 mm. in internal circumference, with well-formed valves—normal size at 30 is 55–79 mm. (Tabulæ biologicæ 1926). The orifices of the coronaries were normal. The infundibulum of the right ventricle was small and ended blindly at the valves, which were found to form a conical membrane projecting into the pulmonary artery. This was 20 mm. in circumference—average normal 66·5 mm. (Tabulæ biologicæ 1926)—and with its thin walls looked like a vein. The ductus arteriosus and the foramen ovale were closed. There was a large infarct occupying almost all the lower lobe of the left lung. In the roots of the lungs were large bronchial arteries. The orifice of that supplying the left lung was 10 mm. in diameter; the other, on the right side, was 15 mm.—normal 1–2·3 mm. (Vierordt 1906). They ran just below the bronchi. The pulmonary arteries were small and thin-walled: the pulmonary veins seemed to be of normal size.

Summary.—Pulmonary atresia. Dextroposition of aorta. Patent interventricular septum. Hypertrophy of bronchial arteries.

CASE 2.—A wire-worker aged 20, who had lived a fairly active life, with no restriction of exertion. As a boy he had not cared for games, but preferred long walks. On leaving school he was employed as a house-boy, and found no difficulty in scrubbing floors, washing motor-cars, and helping the gardener. His last illness started as a "cold" which lasted two weeks.

On admission to hospital he was very cyanosed, with orthopnœa. The heart was much enlarged, with a loud systolic murmur all over the precordium. The second sound was clear. There were also the results of failure of the right ventricle. The right axillary vein was thrombosed. There was acute bronchitis. The fingers were slightly clubbed.

Post mortem, there was great hypertrophy and dilatation of the heart chambers, particularly affecting the right auricle and ventricle (weight 560 g.). The foramen ovale was closed. The infundibulum of the conus arteriosus of pulmonary artery could not be identified. The pulmonary arteries were hypoplastic and adherent to the wall of the aorta (Fig. 1). The main pulmonary trunk at its origin measured 5 mm. in diameter, and here its wall measured 0·1 mm. thick—normal diameter about 20 mm., thickness of wall 1·1 mm. (Vierordt 1906); near its bifurcation the lumen became a little wider and the wall thinner. The pulmonary valves were fused and formed an imperforate cone at the base of the artery. The aorta was central over the interventricular septum; this was deficient at its upper end, leaving a hole 4 cm. across and 2·5 cm. between septum and base of aortic valve. The coronary arteries were normal. The ductus arteriosus was closed. The bronchial arteries were both very much enlarged—the orifice of the right 15 mm. in diameter, and that of the left 13 mm. in diameter (Fig. 2). The left was filled with a thrombus. There was an ante-mortem thrombus

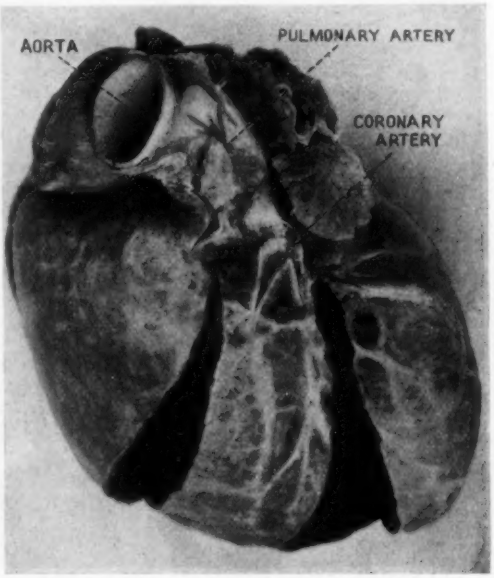

FIG. 1.—View of heart showing pulmonary artery adherent to aorta. The opened coronary artery was in every way normal.

in the right axillary vein and in the superior vena cava. There were also bilateral pleural effusions, a nutmeg liver and ascites, pulmonary tuberculosis and tuberculous enteritis. Section of the lungs showed inconspicuous pulmonary arteries, while the bronchial arteries were prominent.

Summary.—Pulmonary atresia. Dextroposition of aorta. Patent interventricular septum. Hypertrophy of bronchial arteries. Pulmonary and intestinal tuberculosis.

In addition to these two cases we will refer to the accounts of two others which have already been published—one by Bach (1928) and the other by Myers (1925). The first was seen in hospital by one of us (T. E.) several times; and also the second, when shown to the clinical section of the Royal Society of Medicine.

CASE 3 (Bach's case).—A man of 30, who was always very blue and had been liable to attacks of hæmoptysis and fainting. There was pronounced clubbing of fingers and polycythæmia.

Clinically the heart was not enlarged and there were no murmurs. The electrocardiogram showed right axis-deviation. He died of meningitis.

Post mortem, the heart weighed 12¼ oz. (412 g.). There was hypertrophy of the right ventricle. A hole was present in the upper part of the interventricular

septum, 2 cm. across. The aorta was enlarged and dextroposed, placed over top of septum. The right coronary artery only present. The infundibulum was shut off from the right ventricle, except for a very tiny hole (Keith's lower bulbar stenosis). The pulmonary artery was small and thin-walled, with three malformed valves. The ductus arteriosus was closed. The foramen ovale was slit-like. No mention is made of the state of the bronchial arteries. One cannot but wonder whether they were enlarged.

Summary.—Pulmonary atresia. Patent interventricular septum. Dextroposition of aorta. Single coronary artery.

CASE 4 (Myers's case).—A child aged 6. Cyanotic, with paroxysms of increased cyanosis. Mentality

FIG. 2.—Aorta opened from behind showing mouths of greatly hypertrophied bronchial arteries and thrombosed left bronchial artery.

backward. Pronounced polycythæmia and clubbing of fingers.

Clinically there was no cardiac enlargement, and no murmurs or thrills were detectable.

Post mortem, there was hypoplasia of the infundibulum of conus arteriosus. The pulmonary valves were fused. The pulmonary artery was half the normal size, and thin-walled. The ductus arteriosus was closed. The aorta was wide and dextroposed over septum of the ventricles, in which was a large hole. Three small bronchial arteries (each about 1 mm. in diameter) carried blood to the lungs.

Summary.—Pulmonary atresia; dextroposition of aorta; patent interventricular septum.

COMMENTS

These four cases are examples of Fallot's tetralogy in which the hypoplasia of the conus of the pulmonary artery was so extreme as to amount to pulmonary atresia. In all of them the ductus arteriosus was closed. The only channels by which the blood could reach the lungs were the bronchial arteries. In two instances these vessels were greatly enlarged. In spite of their disabilities the ages at death were 33, 30, 20, and 6 years. Two of them died of intercurrent disease, so that otherwise their lives might have been longer. Thrombosis occurred in the bronchial arteries in two cases, no doubt with serious effects.

Rôle of the bronchial arteries.—How it should come about that the bronchial arteries become so large is difficult to explain. It is clear that, in the event of the ductus arteriosus closing, it is of prime importance that they should do so. The patient in whom they were small died in early childhood. It is unsatisfactory to accept a purely teleological explanation. Perhaps the low pressure in the branches of the pulmonary arteries after closure of the ductus arteriosus allows dilatation of the bronchial arteries, which anastomose with them. Perhaps there is some nervous mechanism controlling the dilatation of pulmonary and bronchial vessels which brings about enlargement. The matter is quite obscure. Little attention seems to have been paid to the possibility of the bronchial circulation supplementing the usual pulmonary one. It would be interesting to know whether enlargement of the bronchial arteries ever occurs in the valvular type of pulmonary stenosis, which probably develops later in fœtal life than the hypoplastic type. One can hardly suppose that the arteries enlarge before birth. In a case of valvular pulmonary stenosis we recently saw the bronchials were of normal size. In Case 4 (Myers) they had not become enlarged.

Diagnosis of pulmonary atresia.—Of recent years the diagnosis of congenital cardiac disease has become more accurate because its basis has been more precisely defined. This is largely due to the work of Maude Abbott (1936). The additional information provided by the electrocardiogram and the skiagram has been correlated with the clinical and pathological findings. Of the cases in the cyanotic group which survive infancy, Fallot's tetralogy is easily recognisable by its characteristic outline in the skiagram (cœur en sabot) and the systolic thrill and murmur. When the patient has survived infancy it should be possible to make the diagnosis of complete pulmonary atresia. Of course, the cyanotic lesions can rarely be distinguished in the first few months of life and many do not allow survival longer than this. If the ductus is closed the outline of the heart in complete pulmonary atresia will be as in Fallot's tetralogy. There will be cyanosis due to the venous-arterial shunt—Lundsgaard's α factor (Lundsgaard and van Slyke 1923)—though insufficient aeration in the lungs, and peripheral stasis (D factor) may also play a part in causing it. If there is a loud basal systolic murmur the case cannot be distinguished from Fallot's tetralogy. This was so in our Case 2. If there is no pulmonary systolic thrill and murmur the matter is different. Pulmonary atresia was noted in 12 instances in the analysis of 1000 cases of congenital cardiac disease by Maude Abbott (1936); of these 5 had no murmurs. When Case 1 was seen, remembering the post-mortem findings in Case 3 (Bach) and Case 4 (Myers), the possibility of complete pulmonary atresia was suggested. The clinical picture, then, seems to be recognisable. The patient is cyanosed since birth, with the usual polycythæmia and finger-clubbing, thus excluding cases of "cyanose tardive," which may develop in the valvular type of pulmonary stenosis. The heart may or may not be enlarged clinically, but it will have the "cœur en sabot" outline in so far as a concavity replaces the pulmonary bow. The aorta will be dextroposed. The electrocardiogram will show right axis-deviation. The important point is that there is no loud systolic murmur and thrill over the pulmonary artery. It must be remembered that failure of the heart tends

to abolish murmurs, and that in any case an expected murmur may be unaccountably absent.

If the bronchial arteries are enlarged the patient may lead a fairly active life well into adult years. The part they may play in providing a collateral circulation to the lungs when the pulmonary artery and ductus arteriosus are closed needs further attention.

SUMMARY

Two cases of complete pulmonary atresia reaching adult life are described. In these patients the bronchial arteries were the only channel for the blood to the lungs, for the ductus arteriosus was closed.

Two other published cases are quoted for comparison. The possibility of the diagnosis of pulmonary atresia on the physical signs is suggested.

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DIPHTHERIA OUTBREAK ASSOCIATED WITH ICE-CREAM

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Outbreaks of illness have frequently been attributed to infected ice-cream but it is uncommon for diphtheria to be the disease reported. In the Ministry of Health (1935) records of 20 outbreaks and in one reported since (1936) other conditions have been responsible. Infections other than diphtheria were also concerned in outbreaks recorded in Glasgow in 1931, 1933, and 1936, in a county outbreak investigated by the city bacteriologist in Glasgow in 1931 and in the Aberdeen epidemic which involved some visitors from Glasgow and was reported by Kinloch (1925).

When diphtheria is food-borne the vehicle is practically always milk or a milk product. During the period 1907–36 five outbreaks of milk-borne diphtheria involving 77 cases have been recognised in Glasgow as follows: 15 cases and 20 cases in 1912, 30 cases in 1913, 5 cases in 1926, and 7 cases in 1936. Glasgow records for the same period also illustrate the fact that the frequency of diphtheria infections due to milk is less than that of scarlet fever infections. Scarlet fever infections recognised as milk-borne involved 434 persons comprised in nine outbreaks described in the annual medical and sanitary reports for Glasgow (1908, 1912, 1913, 1923, 1925, 1931, 1932).

THE OUTBREAK

In August, 1937, the first Glasgow epidemic of diphtheria attributed to ice-cream occurred in connexion with an ice-cream shop in a south-side industrial ward. It involved 13 persons, including one secondary case. A striking feature was the severity of the primary cases, 6 of whom died. The Table shows that all but one of the cases infected were children, that 9 were infected on one day, and that the majority sickened two days after consuming the ice-cream.

The opportunity for administrative action thus arose on August 20th, the removal to hospital of several cases of diphtheria from a restricted area having then been reported. Special inquiries made on that day regarding the consumption of ice-cream pointed to one of the 13 ice-cream shops in the affected ward. Complete information about recent illness in the shopkeeper's family was not provided till a later date; but the three persons found in the shop were swabbed on August 20th and one of these, the shopkeeper's daughter, was excluded from the shop as she showed a clinical abnormality in the form of nasal excoriation. Next day she was sent to a fever hospital as nose and throat swabs had been reported positive; the shopkeeper, whose throat swab was negative, was instructed to live away from home and to arrange to buy in his ice-cream; the shop assistant, whose throat had yielded a positive swab, returned

SUMMARY OF CASES

Case.	Sex.	Age.	Date of eating ice-cream from shop.	Days from eating ice-cream till sickening.	Admission.	Days from eating ice-cream till death.	Type of organism.
1	Girl.	17	August 2nd	4	August 7th	—	—
2	Boy.	6	8th (& 10th)	2	12th	6	IV
3	Girl.	4	15th	2	18th	9	IV
4	Sisters	7	15th	2	19th	—	IV
5	Sisters	5	15th	2	19th	—	IV
6	Boy.	9	15th	2	19th	—	IV
7	Girl.	12	15th		19th	10	IV
8	"	6	15th	2	19th	5	IV
9	Boy.	8	15th	2	19th	—	IV
10	"	3	14th	4	19th	21	—
11	"	5	15th	3	21st*	13	—
12	Girl.	8	15th	5	22nd	—	—

* Tracheotomy.

Case 13, a boy aged 10, who sickened on August 18th, was a direct contact and playmate of Case 7.

to her home in another town. On August 21st also the utensils were sterilised and 24 gallons of ice-cream and "mix" found in the shop were rendered unsaleable by the addition of soap powder pending removal for destruction. On August 24th the shopkeeper was excluded from the shop because a nose swab had been found positive although this throat remained negative. The business was thereafter conducted by a friend. It will be noted that although 2 further cases were admitted to hospital during the investigations they had been infected before these began.

Further details regarding the three persons present in the shop when the cases occurred are as follows:—

The shopkeeper had until July owned a sweet-shop in a small town in an eastern county where he had sold ice-cream, bought in, at the week-ends only. There had been no undue prevalence of diphtheria in that town. He opened the Glasgow shop on Sunday, August 1st. He proved to be a *virulent nasal carrier* (*Type IV*). A heavy pipe and cigarette smoker, he appeared to suffer from mild chronic pharyngitis, and on inquiry said that he had had a slight cold on or about August 17th. Early in September he was sent to a fever hospital after a throat swab had been found positive.

His daughter, aged 12, who was sent to a fever hospital on August 21st, was suspected of being a *virulent carrier* (*Type IV*) as the second of four guinea-pig inoculations gave a positive result for virulence. Her tonsils had been removed when she was aged 4, and in February, 1937, she had received one prophylactic antidiphtheria injection.

The shop assistant, aged 19, had come from a town in a Midland county on August 12th to work in the proprietor's shop and to live in his household. She

had remained in normal health. Her throat swab was *positive* (*morphologically* only) and it was not further investigated.

The shopkeeper's home, which was situated at a different address from the shop, was first visited on August 21st. Full information about familial illness was still withheld, but three of the four persons found there were discovered to be infected. They had arrived in Glasgow on August 19th. Information regarding these four persons became available later as follows :—

Daughter, aged 2, in spite of one prophylactic injection in February, 1937, had been a diphtheria patient in a county fever hospital from June 29th until July 24th, when she had been dismissed after two negative swabs. In Glasgow in August a second and subsequent throat swabs proved positive, and in September she was sent to a fever hospital as a *convalescent carrier* on morphological grounds. Her tonsils were enlarged.

Son, aged 5, was found to be a case of *missed nasal diphtheria* (*Type IV*) and was sent to a fever hospital. His tonsils had been removed when he was aged 2, and on July 14th, 1937, he had received one prophylactic injection.

Daughter, aged 9, gave four negative throat swabs. Her tonsils had been removed when she was aged 7. She had received two prophylactic injections in February, 1937.

The shopkeeper's wife proved to be a *virulent throat carrier* (*Type IV*). Her tonsils were slightly enlarged but not inflamed and she had been liable to sore-throat since 1920.

Information was also obtained later regarding the following absentee from the home :—

Daughter, aged 16, had been admitted as a *positive diphtheria* case to a county fever hospital on August 2nd, having sickened the previous day. She had previously had her throat swabbed with negative result on July 1st as a contact of the first case of diphtheria in the household, her sister aged 2. At the beginning of August when this second case of diphtheria was detected the movements and activities of the shopkeeper had not been reported to the county authorities.

It is thus obvious that the shopkeeper and his family provided an abundant source for diphtheria infection. It was also obvious that his business exposed a considerable number of persons to infection. His shop sold 8 gallons of ice-cream daily on weekdays and 12 on Sundays. Children formed a majority of the customers and usually bought a halfpennyworth weighing 1½ oz. Adult customers usually bought a quantity weighing 4 oz. It was calculated that an average of 70 customers would partake of a gallon of the ice-cream. It was of the "custard ice" type and was manufactured by the "hot mix" method. During the early part of the week the proprietor would make "mix" and freeze it daily, but towards the end of the week he would make a large quantity of "mix" and store it for the week-end in uncovered pails on open shelves in the scullery at the rear of the shop.

EPIDEMIOLOGY

It is of epidemiological interest to record that in August 6 other cases and in September 8 cases were registered from the affected city ward. No other connexion could be established between these and the outbreak. During the previous twelve months the number of cases from this ward had averaged 2·3 monthly; and the numbers returned to this level in October and November when 2 and 3 cases respectively were notified. Three of the 6 August cases died. Two of these fatal cases had been examined for type of organism and Type IV had been reported. Only 1 of the 8 September cases died.

It is probable that few, if any, cases infected in the shop remained untraced. Inquiries regarding consumption of ice-cream were made in August and the early part of September concerning over 100 other cases of diphtheria notified during that period from an extensive south-side area of the city. No further cases connected with the outbreak were discovered. Excluding the affected ward the number of cases registered in Glasgow in August and their fatality were exceeded in other months during the year.

With regard to the bacteriological findings, Carter (1936) had found only 10 Type IV strains in 1614 positive swabs examined in Glasgow between May, 1934, and January, 1936. One learned, however, that in 1937 this type had been more often encountered in the City Laboratory and that in the autumn it was recovered from several cases besides those mentioned above.

Clinical reports from hospital stated that 11 of the primary cases showed disease of the tonsils, uvula, and soft palate, and that one of these cases had also laryngeal disease; in one case membrane was limited to the tonsils. All the primary cases were severe. The secondary case was of moderate severity.

I wish to thank the city bacteriologist for the special information readily supplied by his department.

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ABDOMINAL AORTIC ANEURYSM ASSOCIATED WITH GENERAL PARALYSIS OF THE INSANE

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Kampmeier (1936) has recently published a paper dealing very fully with the symptomatology and findings of 73 cases suffering from abdominal aortic aneurysm, together with a comprehensive review of the relevant literature. We therefore propose to confine ourselves to the description of a case which recently came under our care.

CASE REPORT

The patient acquired syphilis in 1916 when aged 27, for which he said he had received injection treatment in Australia; the details of this treatment we have not been able to obtain.

In May, 1927, he was admitted as an in-patient to Brompton Hospital for four weeks; he complained of pain in the right side of the chest, backache for the past fifteen months, lassitude, and occasional cough with scanty expectoration. The pain was a constant dull ache with occasional sharp exacerbations unrelated to food, exertion, or breathing, and situated in the right loin. There was a family history of tuberculosis. On examination the only abnormal findings were diminished knee-jerks, obtained only on reinforcement, and in the radiogram of the chest and heart was noted scoliosis with dorsal convexity to the right, the heart lying in the concavity of the curve.

From July, 1927, to February, 1928, he attended the out-patient department of the National Hospital

for Diseases of the Heart, still complaining of spasmodic pain in the lumbar region and also of left inframammary pain, exhaustion, night-sweats, and slight cough. Here a diagnosis was made of syphilitic cardiac enlargement, a slight increase in the size of the heart and tachycardia being the only abnormal findings noted. The patient continued to complain of discomfort in the chest and pain in the right lumbar region, and in February, 1928, he had a syncopal attack while at work.

About this time he was asked to resign from work as a boatman on the Thames, but he and his wife began making women's and children's garments and until 1934, in spite of "terrible turns of pain in his back," he continued to work a treadle sewing machine and to hawk round the goods which they made, though "his legs ached a lot and he could not walk far without wanting to lie down."

In November, 1930, he attended the Middlesex Hospital complaining of sharp shooting pain in the right side of his back, and he was then found to have signs of central nervous system involvement, Argyll Robertson pupils, and analgesia over chest, calves, and shins, but his reflexes were present. In October, 1931, he lost the use of his legs and was in bed at home for "a long time."

In April, 1932, he reattended the Middlesex Hospital and was subsequently admitted. His physical signs were as above, but, in addition, there was found severe deformity of the spine and a positive Wassermann reaction of the serum. A radiogram of the spine was interpreted as follows: Destruction of the sides and anterior parts of the bodies of the 10th, 11th, and 12th dorsal vertebræ with fairly marked angulation in this region. Joint spaces have become obliterated and antero-posterior view shows shadow to the left of the involved vertebræ which may be that of an abscess. Diagnosis: tuberculous or tabetic spine (Fig. 1). The patient was fitted with a spinal support and treated with N.A.B., mercury, and potassium iodide.

About August, 1934, he suddenly developed the typical grandiose symptoms of general paralysis of the insane, necessitating his removal to hospital and certification. The physical signs of the disease were not very pronounced, his pupils were of medium size, unequal, right larger than left, irregular, the light reflex was present in the right but absent in the left; the knee-jerks were diminished but equal, while the ankle-jerks were brisk; deep pressure pain was diminished in the calves, but his gait is said to have been normal and Romberg's sign negative, and he had a kyphosis. Speech was normal. It was noted at the time that the physical signs were those of G.P.I. rather than of tabes.

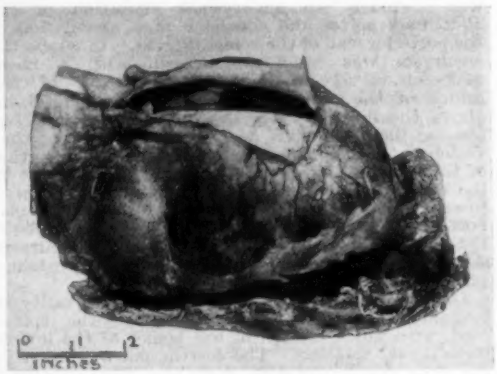

FIG. 2.—The aneurysm, opened from the anterior aspect, and part of the posterior abdominal wall.

He was given malaria therapy, having thirteen peaks of fever, followed by 22 g. of tryparsamide; he then showed considerable improvement, worked in the clerk's office, and was allowed ground parole.

In February, 1935, he began to develop definite symptoms and signs of compression paraplegia; swelling of his left ankle with sensations of "warmth" and "pins and needles," shooting pains in the ankle, and soreness round the waist. In April, 1935, he became very unsteady on his legs and had to be put to bed; his knee-jerks were very much diminished and his sense of position much impaired, but his ankle-jerks remained brisk.

The paraplegia gradually progressed, his lower limbs became completely powerless and œdematous, he had difficulty with micturition, and ultimately developed trophic sores on sacrum, hips, scrotum, ankles, and feet, and finally died on Jan. 28th, 1937. As he first began to complain of pain at the beginning of 1926, the duration of the aneurysm must be at least eleven years.

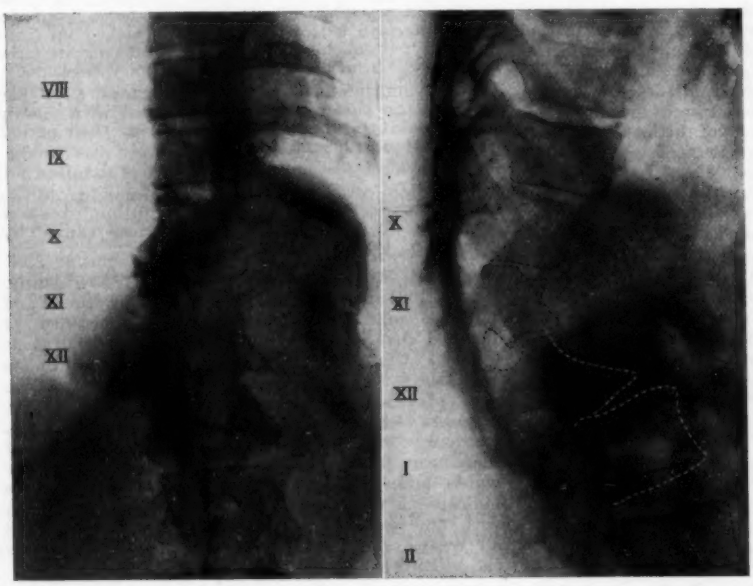

FIG. 1.—Antero-posterior and lateral radiograms showing shadow cast by aneurysm and erosion of vertebra, producing angulation.

POST-MORTEM FINDINGS

The patient was a rather undernourished man with a moderate degree of dorsal kyphosis, the curvature being greatest in the lower dorsal area, but not in any way confined to that region. Examination of the organs revealed a congested right lung and definite "red hepatisation" of the lower lobe of the left lung. The heart showed no gross changes and the abdominal organs were normal in appearance.

A large retroperitoneal tumour was observed which

was obviously an aneurysmal dilatation of the abdominal aorta, and consisted of a sacculation of the posterior wall of the vessel (Fig. 2). In shape the aneurysm was roughly spherical, with a mean diameter of 5½ in. The lower margin of the orifice of the aneurysm was situated some 3 in. above the level of the 1st lumbar vertebra, but the sac itself extended as low as the body of that vertebra, thus displacing anteriorly the intact portion of the aorta. Above, the aneurysm was adherent to the central portion of the diaphragm and appeared to extend as far as the upper limit of the abdominal portion of the vessel. The inner surfaces of both the undilated portion of the aorta and the aneurysm showed numerous atheromatous and syphilitic plaques.

Dissection of the back revealed a large quantity of laminated blood clot penetrating into the spinal cord, with much erosion of the bodies of the lowest three dorsal vertebræ. The destruction was worst in the 11th dorsal vertebra, but there was no actual collapse of the column.

The spinal cord in the region of the vertebral erosion was embedded in blood clot, and on removal revealed an extensive destruction of the anterior portion of the lowest 3 in. of the cord itself and of the uppermost inch of the cauda equina. The damage was greatest at the centre of this area and accounted for almost half the depth of the cord. Sections of the cord taken 1½ in. above the erosion showed a complete bilateral degeneration of the posterior columns, and slight degree of peripheral degeneration in both postero-lateral areas. Selective staining demonstrated that much of this white matter degeneration was of fairly recent origin.

Histopathological examination of the brain confirmed the clinical diagnosis of G.P.I.

The two main features of interest in this patient were the long duration of the history and the association of the aneurysm with general paralysis of the insane.

We wish to thank the Brompton Hospital, the National Hospital for Diseases of the Heart, and the Middlesex Hospital for supplying us with such exact details of the patient's earlier signs and symptoms, thus making possible a complete and accurate clinical history extending over many years. We are also grateful to the Middlesex Hospital for allowing us to reproduce the radiogram.

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MEDICAL SOCIETIES

SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT a meeting of the fever hospital medical service group of this society, held on March 25th, with the president, Dr. J. A. H. BRINCKER in the chair, a discussion on the spread of

Streptococcal Infection as Ascertained by Type Determination

was opened by Dr. V. D. ALLISON (Ministry of Health Pathological Laboratory), who described the classification of hæmolytic streptococci into groups by Lancefield's precipitation method, the importance of Group A in human disease, and the identification within this group by Griffith of some 26 serological types by means of specific agglutinating sera. The multiplicity of types was, he said, of real help in tracing the sources and paths of spread of infection, while group classification was of little value as it did not exonerate from suspicion those who might be harbouring Group A type other than the type responsible for the outbreak. The main value of type determination in infections caused by *Str. pyogenes* was, he said, to be found in two directions:—

(1) The investigation of the source and paths of infection in explosive outbreaks of streptococcal infection due, for example, to milk and in outbreaks of puerperal fever in maternity homes and hospitals.

(2) The investigation of the paths of spread of infection in the wards of general and fever hospitals, and the effects of reinfection and cross-infection as the cause of grave complications.

The advantages of type determination had been well exemplified in many explosive outbreaks of streptococcal infection, some of major importance, during the last few years, for example, the outbreaks caused by milk infected with *Str. pyogenes* at Denham, Chelmsford, and Doncaster, where in each case the source of infection had been definitely established. In numerous outbreaks of puerperal fever the identification of the infecting strain had given a clue leading to the discovery of the source of infection. In his own experience, said Dr. Allison, epidemiological investigations of streptococcal infections in multiple-bed scarlet fever wards and in cubicles had shown conclusively that—

(1) Patients nursed throughout their illness in cubicles or chambers show no change of the serological type of the infecting streptococcus. Segregation of patients in small wards according to the serological type of the infecting streptococcus showed that if a change of type occurred, it was due to the introduction of fresh infection by a member of the ward staff.

(2) Infection with one serological type of *Str. pyogenes* does not necessarily protect a patient against infection with another type.

(3) The so-called relapse in scarlet fever is due to fresh infection with a streptococcus picked up from another patient in the ward and differing in serological type from that causing the primary infection.

(4) In multiple-bed wards for scarlet fever 50–70 per cent. of the patients become reinfected with one or more fresh types of *Str. pyogenes* during their period of detention in hospital.

(5) Such reinfections may be latent or manifest.

(6) Complications in scarlet fever occurring during the third week and subsequently in multiple-bed wards are in the great majority of cases caused by reinfecting types of *Str. pyogenes*.

Turning to the paths of infection, Dr. Allison quoted experimental proofs of spread by direct and indirect contact, illustrating the importance of infected toys, handkerchiefs, and eating utensils as vehicles of infection. Air-borne infection by droplets was also a well-recognised means of spread, but the part played by dry dust particles, in which *Str. pyogenes* could survive for a considerable time, was only beginning to be recognised. Exposure of blood-agar plates for short periods in scarlet fever wards and examination of the resulting cultures indicated a surprisingly high degree of air infection with *Str. pyogenes* and the types isolated from the air were exactly those found as infecting agents in the patients in the ward.

In measles wards and in the wards of general hospitals the problem of the spread of streptococcal

infection was, said Dr. Allison, equally important. In a measles ward over a period of seven weeks *Str. pyogenes* had been isolated at some time during their stay in hospital from 35 out of 43 patients and 22 of these were the result of cross-infection occurring in the ward. Out of 17 cases of otitis media in the series, 8 were due to cross-infection with types of *Str. pyogenes* from other patients in the ward. The problems raised by these findings were now being investigated and cumulative evidence showed the pressing need of dealing with them with a view to getting fewer complications, a decrease in the average period of hospitalisation, and better end-results of treatment.

Dr. R. CRUICKSHANK (L.C.C. Group Laboratory, N.W. Hospital) said he wished to draw attention specially to air-borne infection. By this he meant not "droplet" or "spray" infection which had only a very limited spread but the dissemination of bacteria by the air rather like nature's method of sowing seeds. Recent epidemiological and bacteriological findings have suggested that infection—and not only respiratory tract infection—spreads, in spite of rigid precautions against manual transference, by fomites or by carriers. The work of W. F. and M. W. Wells in America has demonstrated how this may be possible. They showed that droplets expelled into the air by coughing and sneezing need not immediately fall to the ground within a few feet of the individual. If the droplets do not exceed 0·1 mm. in size, evaporation rapidly reduces them to so small a compass that they remain suspended in the air like particles of smoke. Larger droplets or other infective material that do settle may become evaporated and be lifted into the air again as dust. The potentiality of these "droplet nuclei," as Wells calls them, for spreading infection will depend among other factors on their viability and their concentration. Wells found that certain organisms which commonly occur in the upper respiratory tract, e.g., hæmolytic streptococcus, pneumococcus, *C. diphtheriæ*, remain viable in the atmosphere for two days, whereas intestinal bacteria, e.g., *B. coli*, *typhosus*, and *dysenteriæ*, died off within eight hours.

Dr. Cruickshank went on to give examples in his own experience of air-borne spread of streptococcal infection, corroborated by the new method of serological typing.

The first of these concerned infection of burns which are particularly susceptible to the streptococcus. In a burns ward, it was found that 8 cases were infected with the same type of *Str. pyogenes*, that the dust and atmosphere of the ward contained numerous hæmolytic streptococci, and that a strain isolated from the dust was the same serological type as a culture from an infected burn. Great care was taken to prevent manual spread from case to case and throat carriers among the nursing staff were not common.

The second example was a small outbreak of puerperal sepsis where throat carriers and direct transference could be almost certainly excluded and where again the epidemic type of *Str. pyogenes* was found in the atmosphere of the ward. The abraded genital tract of the parturient woman is, like a burn, particularly susceptible to attack by the streptococcus.

Occurrence of streptococcal infections (tonsillitis, otitis media, and vaginitis) in a diphtheria ward of young children furnished the third example. In addition to the clinical infections most of the children had hæmolytic streptococci in the nose or throat (more particularly in the nose), whereas there were no carriers among the nursing staff. Hæmolytic streptococci of the two infecting types were present on plates exposed in the ward and were most numerous where the infected cases were occurring (although the plates were beyond the reach of "droplets") and after the dust of the ward had been stirred up by sweeping and dusting.

Dr. Cruickshank suggested that we should not be too ready to incriminate nursing staff for the spread of infection, that we must not depend too much on bed-isolation to prevent spread, and that wet dusting should be the routine practice in infected wards.

DISCUSSION

Dr. R. A. O'BRIEN (Wellcome Research Laboratories) thought that some of the findings might be open to criticism if they were based on the examination of a single swab from the patient on admission. The opening papers raised some interesting questions. Was the Dick-negative nurse less likely to get a streptococcal infection in a heavily infected ward? Was it necessary to nurse every patient with a hæmolytic streptococcal infection in a single room open only to the air? Should as much care and attention be given to streptococcal carriers as to typhoid carriers?

Mr. T. B. LAYTON (otologist, L.C.C. Fever Hospitals) had visions of patients with hæmolytic streptococcal infections being nursed in wards appropriate to the type of the organism. He commented on the tendency to remove otitis cases from scarlet fever wards in order that they might be isolated, and observed that it was not the otitis case who required to be isolated but the pre-otitis cases. He felt strongly against putting children with ear conditions in glass cells or cubicles as adverse psychological effects might result. The mind as well as the microbe had to be kept in view. He also discussed the rôle of the nurse in cross-infection.

Dr. F. GRUNDY (M.O.H., Luton) suggested that however desirable the practice of swabbing and typing of streptococci might be from a scientific point of view, he wondered if the information thus obtained might not be misinterpreted on occasions in a court of law if an action were brought against a local authority in consequence of cross-infection. Information obtained by swabbing might possibly operate prejudicially in a legal action. With regard to cubicle and chamber nursing it should not be lost sight of that a policy which is practicable in the case of large infectious hospitals, such as those of the L.C.C. and county boroughs, would be impracticable in the majority of small isolation hospitals. Some attempt however should be made in these to reduce the incidence of so-called relapses in scarlet fever by the avoidance of overcrowding and by grouping cases in such a way that convalescents without complication are not brought into contact with acute admissions.

Dr. A. TOPPING (sen. medical officer, L.C.C.) said he did not entirely agree with Mr. Layton about the bad psychological effect of keeping children in solitary isolation where single rooms were constructed mainly of glass. In modern single-chamber units children had little if any feeling of being shut off from their fellows and the majority of them kept remarkably cheerful. He emphasised the necessity for agreement as to the name to be applied to such separation rooms; the word "cubicle" should, he thought, only be used where walls did not extend from floor to ceiling. There was, he suggested, a tendency to attribute the occurrence of puerperal sepsis to the nurse or the midwife in the case who happened to harbour a hæmolytic streptococcus in throat or nose without excluding other more likely causes.

Dr. E. H. R. HARRIES (L.C.C. North Eastern Hospital) endorsed the opinion of Dr. Topping that in cubicles or chambers of modern design and lay-out children did not become depressed and miserable. "Singularly cheerful" had been applied by independent medical observers to the demeanour of children in the new chamber blocks at his own hospital. As to the rôle of particles floating in the air of wards as agents in the dissemination of infection, as distinct from droplet spray, Dr. Harries drew attention to C. V. Chapin's classical "Sources and Modes of Infection" (1910). This book was in a way the bible of those, such as Dr. Claude Rundle, who had carried out the earliest experiments which led to the establishment of bed-isolation methods in this country. Chapin discounted the importance of air-borne infection and stressed that of droplet spray, the hands of attendants, and utensils. Damp-sweeping, or better the use of vacuum cleaners, was an essential part of the technique of bed-isolation. Nobody would intentionally admit patients in the early stage of chicken-pox or measles to a bed-isolation ward. The infectious conditions most safely managed in these wards without spread were those due to the hæmolytic streptococcus. Patients suffering from scarlet fever, erysipelas, and puerperal sepsis had in his own experience been nursed at the same time in the same ward under bed-isolation conditions without spread of infection to other patients. Nevertheless, other factors remaining unaltered, it was possible so to increase the load of streptococcal infections in the ward that the system broke down and cross-infection occurred. Dudley's conception of the "velocities of infection" was, he thought, important.

Dr. J. C. SLEIGH (M.O.H. Chatham, late Chelmsford) remarked that a curious feature of the Chelmsford outbreak was that of 33 cases of scarlet fever with onset in the fortnight previous to the milkman infecting the milk 28 received their milk from the infected source. They were late notifications and so were not typed but it suggested that the milk had been infected earlier, that the milkman was infected from his own milk, and that the passage through the human host had raised the virulence of the strain, leading to the explosive outbreak. With the assistance of Dr. Camps typing had been continued since the outbreak and it was found that in a comparatively small district there were seldom more than 3–4 types at any one time. Cases showing secondary rises of temperature were re-typed and always showed a different type from that obtained on admission. Lately all cases had been kept in bed till fit for discharge; this had lowered considerably the amount of cross-infection and as they were usually negative for hæmolytic streptococcus by the end of the third week it had not meant keeping them in bed too long. Typing also helped in separating out true "Return" cases. A patient had been admitted as a probable mastoid; he was type 6 but cleared up and was discharged. Within 36 hours he was readmitted almost moribund and died within 24 hours of streptococcal meningitis. It looked as if a bad mistake had been made until the streptococcus in pus from the brain was shown to be of type 1, and there were no other cases of that type in hospital at the time. Unless one could type the streptococcus found it was, he thought, unwise to swab the midwife's throat, as it would simply take off duty a large number of midwives unnecessarily.

Dr. J. MCGARRITY (City Hospital, Birmingham) advocated the value of fresh air and bed-isolation principles in ordinary wards. He deprecated overcrowding. In Birmingham there were three bed-isolation wards where all sorts of doubtful cases were isolated; in these wards cross-infection was non-existent during recent years. The technique of bed isolation was carefully observed and the windows were wide open all the time, both night and day even in the winter. The temperature of the ward did not matter; patients could be kept warm with the help of extra blankets and hot-water bottles. Stuffy overcrowded wards in his experience were bad for the patients and led to such troubles as tonsillitis and rhinitis.

Dr. E. C. BENN (City Hospital, Leeds), speaking of the immunity of Dick-negative reactors to streptococcal infections, said that a fall in the relapse-rate of scarlet fever to less than 1 per cent. followed artificial immunisation by scarlet fever toxin of those children who remain Dick positive in the second week of the disease. He mentioned the frequent occurrence of streptococcal tonsillitis in fever nurses during the first few weeks of their hospital service. As their immunity to streptococcal infection increased, either naturally from exposure to infection or as a result of artificial immunisation, the incidence of streptococcal tonsillitis fell sharply.

Dr. M. MITMAN (L.C.C. Rivers Hospitals) conceded the possibility of aerial contamination by suspended infectious particles, but thought that if it occurred, it was, in most instances, the result of droplet spray. Infection in the air or dust becomes diluted rapidly as the result of drying, the action of sunlight, and the movement of air in a well-ventilated ward. In consequence, the mass of infection is usually insufficient to initiate an attack of the disease. Direct droplet infection must still be considered the most important mode of transmission of infectious diseases. In investigating the contamination of the atmosphere with suspended particles he suggested, as a possible alternative to the elaborate air centrifuge, a blood-agar plate moving slowing in a vertical direction through the air. An adjacent stationary plate would provide evidence of infection from falling particles. In this way a comparison between floating and falling particles could be obtained. Dick-negative subjects were on the whole, he believed, more resistant to hæmolytic streptococcal infections than Dick-positive ones. In acquiring immunity to the antigens of the toxin, a person must also have had an opportunity of acquiring some immunity to the antigens of the organism itself, such as those responsible for its invasive properties. Although the Dick test was no measure of this bacterial immunity, a negative result indicated a previous acquaintance with the organism. Difference in the behaviour of the same type of streptococcus gaining access to the body through different portals of entry was attributable, he thought, to differences in local immunity.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—The following post-graduate courses have been arranged to take place during May: psychological medicine at the Maudsley Hospital (April 25th to May 28th); plastic surgery at various hospitals (May 11th and 12th); proctology at the Gordon Hospital (May 2nd to 6th); gynæcology at the Chelsea Hospital (May 23rd to June 3rd). Week-end courses will be as follows: cancer at the Royal Cancer Hospital (April 23rd and 24th); children's diseases at the Infants Hospital (April 30th and May 1st); chest diseases at the Brompton Hospital (May 7th and 8th); general surgery at the Princess Beatrice Hospital (May 14th and 15th); physical medicine at the St. John Clinic and Institute of Physical Medicine (May 21st and 22nd). Further information may be had from the secretary of the fellowship at 1, Wimpole-street, London, W.1.

REVIEWS AND NOTICES OF BOOKS

Studies on the Physiology of the Middle Ear

By J. GRANDSON BYRNE, M.D. London: H. K. Lewis and Co. 1938. Pp. 298. 18*s*.

THE experiments here recorded were made on the living animal, mainly on cats but some on dogs, and kymographic tracings have for the first time been taken directly from the membrana tympani. The greater part of the book is occupied by a detailed description of investigations into the action and innervation of the tensor tympani, the stapedius, and the dilatator tubæ auditivæ, and each chapter contains a useful discussion of the significance of the various experiments. Dr. Byrne agrees with those physiologists who regard the ossicles and muscles of the middle ear as the accommodation apparatus of hearing, the contraction of the muscles adjusting the membrana tympani and the membrane of the fenestra ovalis for the mediation of various vibrations. The tensor tympani, which retracts the membrane, may be regarded as the analogue of the dilatator pupillæ of the eye, while the stapedius, which produces proptosis of the membrane, is the analogue of the constrictor pupillæ. During coma and sleep the membrane is proptosed and the ear is not accommodated for hearing. When, however, the individual is aroused by a stimulus of sufficient intensity, the "startle reaction" is produced and the membrana tympani becomes retracted, or accommodated for distance, as preparation for "avoidance by flight"; after a moment, however, as he becomes orientated to his surroundings, this gives place to the "reaction in approach" and the membrane becomes partly proptosed or accommodated for near, with the object of investigating the situation. The analogous reaction of the pupil is dilatation followed by constriction. Thus, as the author says, the reciprocally innervated effector mechanisms located in the tensor tympani and in the stapedius furnish a mechanism for auditory accommodation closely resembling in every respect the mechanism of visual accommodation. During sleep proptosis of the membrana tympani adapts the ear for the reception of sound waves of high pitch and intensity, but not for those of moderate intensity incidental to ordinary speech. Hence the sleeper does not hear ordinary conversation well, but, on the other hand, an abrupt stimulus finds too ready transmission through the ossicular chain and strikes the perilymph with such intensity as to cause a painful start. Dr. Byrne concludes this chapter by saying that "we live in an age of noise at the mercy of thoughtless obtrusiveness on the part of noise makers. It is possible to condition the auditory mechanisms to withstand noise in the waking state, but the set of these mechanisms at the onset of sleep is such that no amount of conditioning affords protection from the shock—itself a protective mechanism—inflicted on the tired city dweller, in the night or in the early-morning hours, by thoughtless motorists."

Even those, who may not wish to follow Dr. Byrne through his intricate physiological experiments, must agree with these conclusions. The studies which lead to them were made during a period extending over several years. They were originally intended for publication in scientific journals but, at the last moment, in order to save time, it was decided to issue them in book form; hence the many repetitions which, under the circumstances, are excusable. Dr. Byrne deserves much credit for his planning and skilful conduct of a series of elaborate experiments.

Diets and Recipes

And the Treatment of Diabetes and Obesity. By E. P. POULTON, D.M. Oxon., F.R.C.P. Lond., Physician to Guy's Hospital. London: Humphrey Milford, Oxford University Press. 1937. Pp. 121. 7*s*. 6*d*.

Dr. Poulton wrote this book because of the change that has occurred in the diet of diabetic patients. The food tables in current use in England give, for the convenience of the patient, the different amounts of various articles of foods which contain 5 g. of carbohydrate. Dr. Poulton does not think that patients can make good use of such tables when a diet containing as much as 200 g. of carbohydrate is prescribed, and he has taken 20 g. as the unit which he calls a carbohydrate ration (C.R.). Some foods contain relatively little carbohydrate and these are put into separate tables containing 10 g. of carbohydrate, or ½ C.R. Similarly the foods containing fat are arranged in portions comprising 10 g. and called a fat ration (F.R.), again with a separate table for those articles which contain less fat, prepared on the basis of 5 g. = ½ F.R. The amounts of protein in the foods which chiefly consist of carbohydrate and fat are also shown, and foods which consist mainly of protein are tabulated separately. Thus a diet of 200 g. of carbohydrate and 100 g. of fat would be prescribed as 10 C.R. and 10 F.R., together with the desired number of grammes of protein. This notation and change in the values is at first sight rather confusing, but once the principle is grasped the tables are easy to understand and should prove useful both to patients and to those charged with the responsible duty of planning their diet.

The second half of the book consists of 200 recipes of different dishes, with full details for cooking. The actual weight of the food cooked in this way for several people is given and the index gives the amount of food in ounces, which contain ½, 1, 1½, or 2 C.R. and F.R. portions, together with the amount of protein in grammes. This part of the book will be of special value to patients who feel the need of a very varied diet. A series of specimen diets is supplied. Dr. Poulton has given an informative account of the amount of food required by diabetics and of the way in which it can be calculated; the notes in chapters V and VI on the organic and inorganic constituents of food are well set out. There is also included a clear description of the methods of giving insulin, the symptoms and treatment of hypo- and hyper-glycæmia, and the management of pregnancy and other complications.

Die Insulinshockbehandlung der Schizophrenie

unter Berücksichtigung des Cardiazolkrampfes. By Dr. A. VON BRAUNMÜHL. Berlin: Julius Springer. 1938. Pp. 71. RM.7.80.

WE commented last week on the more theoretical aspects of insulin-shock treatment and in its history this vade-mecum is entirely practical in its aim, and consequently goes into minute details of organisation and procedure. The first part deals with the structure, staffing, and equipment of the insulin unit

and with the preliminary examination of the patients, the keeping of records, writing of letters of inquiry, and similar routine matters. The second part describes the phases of the "classical" treatment according to Sakel, its originator, and the variations introduced by him, as well as others devised by the author for combating resistance to insulin, and testing and inducing sensitisation. Among the latter he sets out his interesting and probably useful "zigzag" method of getting a resistant patient to respond by intermitting or greatly reducing the doses of insulin and then battering away with big doses which are thus effectual. A brief account of how cardiazol can be worked into the insulin treatment, samples of records, and a summary defence of the insulin method against criticism conclude the manual, which leaves so little unsaid that there is even a large coloured plate of the veins of the arm, borrowed with an accompanying description from Spalteholz, to guide the physician.

Theoretical Principles of Roentgen Therapy

Edited by ERNST A. POHLE, M.D., Ph.D., F.A.C.R., Professor of Radiology; Chairman, Department of Radiology and Physical Therapy, University of Wisconsin. London: Henry Kimpton. 1938. Pp. 271. 21*s*.

THE principles that govern radiotherapy are complex, and a clear description of methods in vogue by a number of leading radiologists is welcome. Each section has been entrusted to a different authority. The first on physics is by K. W. Stenström of Minneapolis. He gives a summary of accepted opinions on atomic physics, outlines the methods of analysing the röntgen spectrum, and discusses ionisation and the methods of measuring quantity of radiation. In the second section, R. R. Newell of San Francisco writes on apparatus. He describes transformers, the regulation of tube current, and the special circuits used for X ray work. The short section on super voltage and the production of artificial radioactivity might well have been extended in view of the rapid development of practical super voltage apparatus. The editor, together with Lauriston Taylor of Washington, is responsible for the chapter on dosimetry. They define röntgen ray equivalent absorption current potentials, the half-value layer, and effective wave-length. They record the statement of "equivalent constant potential" as an approximate description of quality, because it is the effective voltage equal to a constant voltage giving the same absorption curve. Röntgen ray quantity, in their opinion, is most satisfactorily measured by ionisation in terms of röntgens (r), and standard and thimble ionisation chambers for dosage meters are described. For clinical dosimetry, the range of potentials and filter is discussed in relation to the preparation of isodose charts. Unfortunately, in spite of this reference to dose with back-scatter measured on skin, the actual dose on skin and its proportional relationship to depth dose are confused by skin doses recorded in "r" units measured in air. It is disappointing that although the well-known Holfelder technique, Dejardin's multiple converging fields, and suggestions made by other radiologists are described, the author gives no information about the methods he himself prefers. Radiobiology is allotted to Francis Carter Wood of New York City, who discusses the mode of action of radiation and its effects on various organs. His own experiments and his reference to "tumour immunity" are of special interest, but the subject as a whole is now too complex to bear compression within a single chapter.

The book closes with some considerations on protection by Lauriston Taylor, and a full list of the recommendations of the National Bureau of Standards of the United States of America.

The Single Woman and Her Emotional Problems

Second edition. By LAURA HUTTON, M.R.C.S. Eng., Physician at the Tavistock Clinic, London. London: Baillière, Tindall and Cox. 1937. Pp. 172. 5*s*.

THE psychological discontents of the unmarried woman, her struggles towards sex adjustment in heterosexual as in homosexual love, has hitherto been treated very scantily even by psychopathologists. Dr. Hutton gives the fruit of her wide experience in this volume, explaining with skill the evolution of these struggles. She not only reconstructs the life-history of a certain type of woman, but wins our sympathy for those who are not only misunderstood, but have undeservedly been condemned. The general practitioner will learn much here of a type of patient whose inner problems are a closed book to him. That a second edition of this modest little volume has been called for is not surprising, for it is a concise and valuable monograph. It is daring without being either provocative or disturbing, and it treats with sympathy and tolerance a subject which has hitherto been left to the novelist and the exploiter of the seamy side of woman's psychology.

History of Corporal Punishment

By GEO. RYLEY SCOTT, F.Z.S., F.R.A.I., F.Ph.S. Eng. London: T. Werner Laurie. 1938. Pp. 261. 10*s*.

PUBLIC interest has recently been aroused by the subject of corporal punishment, and the dramatically opposed views expressed are typical of those on any subject which arouses deep passions. In outlining the history of punishment Mr. Scott does not paint a rosy picture of human nature, and every chapter adds another stain to human character. The treatment of the subject matter is agonising, and will give pleasure only to those who are already dyed with the sadist stain. It is therefore the greater pity that Mr. Scott did not discuss more fully the moral implications of punishment which psychopathology has attempted to make clear. For although he gives many historical data of a lurid kind, he deals most inadequately with psycho-sexual problems of sadism, and still less adequately with those unconscious urges towards punishment which psycho-analysis has made some attempts to elucidate. Although he ends on a benevolent note, advocating the abolition of corporal punishment, his earlier chapters leave the impression of pessimistic resignation that man is indeed base. He gives no indication that the inflictor may be seeking a moral end as well as sadistic gratification. The plea for abolition can only be put forward on the basis of a scientific discussion on the urge to punishment as well as the urge to sadism. It must, furthermore, be driven home by the demonstration that, on balance, this type of punishment does not achieve its aim of correction, and that therefore the problem can only be made clear by a discussion of unconscious causes for punishment, and the unconscious causes of the abhorrence of corporal punishment.

THE LANCET

LONDON: SATURDAY, APRIL 9, 1938

SCHOOL EPIDEMICS

IN 1929 the Medical Research Council acting in conjunction with the Ministry of Health appointed a committee "to inquire into the prevalence and mode of spread of epidemics in residential schools, especially those believed to be spread by droplet infection, and to report upon the means by which they may be prevented or restricted." The first report of the committee, a summary account of which is given on p. 853, is a document of considerable interest and value, not to be belittled on account of the absence of any important conclusions on the control of epidemic disease. The problems of the spread of the acute infectious diseases of childhood have puzzled generations of epidemiologists; they are not likely to be solved overnight, or even in five years. The committee's initial aim has been to obtain, with the coöperation of some of the large public schools for boys and girls, a precise description of the prevalence and behaviour of the various infectious diseases. Until such data—accurate, detailed, and extensive—had been obtained they could offer (and we can only endorse their proper scientific caution) no advice on methods of control. The more limited, but difficult enough, questions they set themselves therefore included: what are the sickness rates in residential schools at the present time, in general and from specific infections? what variability do these rates exhibit in time and in differently or similarly constituted schools? what is the relative power of spread of the various infections studied? how do they affect the different age-groups of children? and what is their comparative importance in contributing to loss of school time or in promoting serious complications and loss of health? Although the collection of material is not yet complete the committee decided that sufficient data on these lines had been obtained to justify the publication of the present interim report.

Before the results of the survey are set out Dr. L. R. LEMPRIERE tells the exhilarating story of the advance that has been made in the medical supervision provided in our residential schools. Certainly the public schools are not without their opponents to-day, but the criticisms do not include CHARLES LAMB'S terrible strictures, of being "haunted by gloom . . . on account of the hunger we all experienced which we had not the means of allaying as we had nothing to satisfy our cravings." Even as late as the early nineteenth century the accommodation of our most famous public school is stigmatised as disgraceful, some of the juniors having to sleep upon the floor. Unlimited beer seems to have been fairly general, but even of that much was undrinkable. In the reform of such conditions this journal played a leading part, campaigning throughout the nineteenth century against the prevalent abuses and hygienic evils of the schools. Dr. LEMPRIERE is convinced that its inquiries and reports "though not always agreeable to the victims" were of the greatest value in leading to the much needed reforms. Summarising the fragmentary historical information available the committee concludes that the material conditions of life in boarding-schools were in the past "unwholesome"—an example perhaps of the under-statement now in fashion. With but one or two exceptions they showed little sign of improvement before the third decade of the nineteenth century; from then onwards we have a series of factors making for improvement. But lack of accurate data for the past, and the fact that the improvements themselves led to the entry of delicate children who in earlier years would have been kept at home, make exact comparisons precarious if not impossible.

The present incidence of illness, analysed in some 170 tables, is based upon information collected from 21 boys' schools and 10 girls' schools over the five years 1930 to 1934. A fairly complete medical history was initially obtained for each pupil and kept up to date throughout school life in these years. A comparison of the experiences revealed by the two sexes immediately emphasises the difficulties of interpreting the results in terms of such factors as environmental conditions. For instance, the attack rates of nasopharyngeal infection were much higher on the girls than on the boys. Were the girls really more susceptible to minor respiratory infections or were they subjected to a stricter control and more frequently kept out of school than the boys for conditions of health which were effectively equivalent? As the influenza rates were broadly equal the committee is inclined to the second view. Equally the older child may remain in school with a slight respiratory attack for which a younger child would be removed. In the figures actually collected nasopharyngeal infections (including influenza) were responsible for 53 per cent. among girls and 43 per cent. among boys of all time lost. Epidemic influenza was confined to the Lent term almost entirely and many other diseases were largely concentrated in it—otitis media, pneumonia, sinusitis, and rheumatism. The Christmas term, it is interesting to note, was never a time of epidemic prevalence of the infectious diseases in either sex. Epidemics of such diseases also appear to differ considerably in their ability to "work themselves out" before the end of term. Whereas about half the outbreaks of measles might be regarded as having come to a natural conclusion, no epidemics of german measles, and only a small proportion of mumps, chicken-pox, and scarlet fever outbreaks could be said to have terminated before the holidays began—an observation which with the available evidence cannot possibly be explained in terms of the number of susceptibles at risk. It is astonishing too how large a proportion of the outbreaks of infectious disease were limited to a single case. German measles the committee finds

the most incalculable disease of all; half its outbreaks did not spread appreciably, in other instances it showed invasive powers only equalled by influenza. With some causes of sickness remarkable sex differences are revealed. The boys suffered twice as frequently as the girls from otitis media, two and a half times as frequently from pneumonia, and eleven times as frequently from acute rheumatism. Clearly various influences may be relevant, for example a stricter control of girls and earlier isolation in the event of illness, fewer large open dormitories in girls' schools, and reduced opportunities of cross-infection.

The report, as we have hinted, raises more problems than it solves. But it at least formulates those problems clearly and no solution is possible until that has been done. The committee regards itself as having completed only the first stage of a journey which must inevitably be long. Some of the striking differences observed in the incidence of sickness between the sexes, and still more between one school and another, may be due to a conjunction of favourable or unfavourable circumstances over a relatively short period of time. If, on the other hand, further observations confirm them, then it may be hoped that administrative action may be based upon the more detailed investigations into the environmental factors which the committee hopes to make at a later date. But the correlation of sickness with specific environmental factors is never likely to be easy. Even with such semi-isolated communities as the public schools there are innumerable ways in which one differs from another. To detect the important influences, to differentiate them from the unimportant, may yet prove impossible, and the committee itself is under no illusions as to the difficulties of its task. Its first report is, however, more than enough to make the student of epidemiology look forward to the next instalment with both interest and optimism.

THE ANDROID PELVIS IN OBSTETRICS

OBSTETRICAL interest in the form of the female pelvis has grown with the advance in the clinical methods of mensuration and with the increase of radiographical facilities. BERRY HART (1916) among others in this country has studied the effects of the form of the pelvis upon the presentation of the fœtal head in labour, and W. E. CALDWELL and H. C. MOLOY (1933) in America have aroused widespread interest in the obstetrical implications of their recent radiological and anatomical studies of the pelvis. It is clear both from the earlier anatomical work and the later radiological surveys that the female pelvis, genetically, racially, and as the result of circulating hormones, may assume normally a form which departs more or less seriously from that standard female type which has been distinguished from the standard male type largely by the work of English anatomists. A. THOMPSON (1899) provided an excellent account of the special characters of the female pelvis. G. ELLIOT SMITH and F. WOOD-JONES (1907–08) added to the reliability of these observations by their examination of a large number of pelves of known sex in their Nubian Anthropological Survey. D. E. DERRY (1908–09) emphasised the importance of the posterior half of the pelvis as the region in which the female characters were likely to be most manifest. Departures from the typical female pelvis have been classified in various ways. A type not often met is one which is wide in the transverse diameter but short from before backwards, called by some the platypelloid type. Another uncommon type is one long anteroposteriorly but narrow from side to side, which owing to this and other features is called the anthropoid type. The most interesting aspect of all studies of the female pelvis concerns the occurrence in women of a type of pelvis which resembles more or less the pelvis of the male and is therefore appropriately termed "android."

W. L. STRAUS (1927) believed that all intergrades exist between the male and female pelvis, and that any insistence upon distinctive female features is likely to lead to error in judging the sex of any specimen; but his own work shows that female sex characters of great reliability do occur in the posterior half of the pelvis. It seems that in all mammals except man the fœtus travels through the posterior sacro-iliac portion of the pelvis, does not rotate, and always presents the occiput posteriorly; and there is thus good biological ground for expecting the greater manifestation of the differential sexual features to occur in the posterior half of the female pelvis. The difficulties in classifying pelves arise from the fact that the inlet may vary independently of the outlet and the posterior half independently of the anterior ischio-pubic portion. However, the problem of classification is rendered simpler if one is content to regard the posterior half of the inlet as of major importance in determining the type of the pelvis in the female. The special features of the android type, which has also been called the masculine type, the funnel type, the inverted type, among other names, are the narrow sacro-iliac notch, the straight wide sacrum with perhaps an increase in the number of sacral pieces, the greater depth, and the narrow forepart of the pelvis. The obstetrical interest in the android pelvis lies in the fact that the amount of space available depends on the inclination of the sacrum, the angle of the sciatic notch, and the length of the lower portion of the ilium. All these are likely to be unfavourable to easy delivery in the android pelvis.

Though the genetic evidence makes it clear that the initial bias towards sexual differentiation depends on the chromosomal constitution, the female having the full complement of 48 while the male has only 47 active chromosomes, yet, as the facts of sex reversal show, the further development of sexual differentiation depends on the special hormonic secretions of the gonad in each sex. Amongst the responses to the gonadic secretions are the bony and ligamentous features of the pelvis, each assuming male or female characters quite early, even in the fœtus. Clearly in the android pelvis there is some inhibition of the morphological expression of the female hormones. Since we know on embryological grounds that the

ovary, unlike the testis, is not really a single gonad but always contains a suppressed testis, we are prepared for the emergence in various ways of the male characters in the female. The ovary being really an ovo-testis, sex reversal can only take the form of the change from the female towards the male type. We might thus reasonably expect to find with an android pelvis other signs of lesser or greater degrees of virilism; Mr. PERCY MALPAS, in a communication to the January meeting of the North of England Obstetrical and Gynæcological Society, brought forward three examples of patients with hirsuties, and a male type of distribution of body hair whose pelvis was of the android type. In two of them the obstetric history was of a persistent occipito-posterior position in the first labour with difficult extraction, in one case resulting in stillbirth. The third patient, who was still undelivered at the time of the communication, also exhibited hirsuties and a male type of hair. These observations are not only of theoretical interest but possibly of practical importance. The discovery of signs of virilism in such easily observed matters as the distribution of body hair might well suggest a more elaborate radiological survey as well as direct measurement of the pelvis, in anticipation of possible difficulties in labour.

PLACENTAL BLOOD

IN Montreal as well as in Leningrad a new source of blood for storage purposes is being exploited—the placenta. Before using placental blood for transfusion the Montreal workers [1] felt that they must justify its safety and at the same time anticipate two probable objections based on age-old teaching. One, which concerns the donor, depends on the idea that the blood should be left in the placenta after the birth of the child, since its presence expedites detachment of the placenta from the uterine wall. GOODALL and his colleagues believe they have disproved this theory; they found that the separation of the placenta lasted no longer and was no less complete than when it was empty of blood. The other objection to be met is that in taking blood from the placenta one is depriving the new-born child of part of its birthright; the good obstetrician allows a decent interval to elapse before tying the cord and separating the infant from the placental reservoir. GOODALL counters by the statement that every child at birth has a polycythæmia and that the addition of still more red cells from the placenta does not give it a helpful start in life.

Having satisfied themselves that they were not interfering with the third stage of labour, and were robbing the baby only for its own good, the investigators began to consider whether in actual fact they could collect the blood. They noticed that when the clamp on the cut cord was released the blood pressure in the cord was often high enough to project the blood as far as 3 ft., and they were thus able to devise a satisfactory technique for collecting the blood and a suitable preservative for its storage. If further experience supports these results the placenta may well become the routine source of blood for transfusions, with the paramount advantage that it provides a virtually inexhaustible supply for use either immediately or after storage. The question of blood group arises. The fœtal blood group at term is fixed, though not necessarily the same as that of the mother. The probability is that in any large institution the groups of the different samples of placental (fœtal) blood will be roughly in the same proportion as those of the recipients; that is, the supply of each group will approximate to the demand. The maternity section of a general hospital is likely to provide enough blood for the needs of the whole institution. The average amount collected from each case is 125 c.cm. which, when added to 125 c.cm. of preservative—the amount advised—will provide enough (250 c.cm.) for a small transfusion. By pooling several samples of the same group after separate cross-matching larger transfusions can be given. There are further advantages in this method. Placental blood has a high cellular content—about 7–7½ million red cells to the cubic millimetre and, moreover, has more coagulation power than adult blood. Whether or not this is, as some would affirm, nature's provision to prevent exsanguination when, as in animals, the cord is torn or bitten, the fact remains that the increase is gradually lost in the ten days following birth. When placental blood is used for transfusing hæmorrhagic patients this characteristic may be welcome. The onset of hæmolysis is said to be delayed until after the fifteenth day—a longer interval than occurs on storage of either fresh or cadaver blood. The hæmolysis is attributed to the disintegration of fragile nucleated red cells rather than the mature ones and is said to have no ill effect upon the recipient.

The number of transfusions so far performed by this method is not stated but we are told that no untoward reactions have occurred. If the number is substantial, and the immunity from reaction is confirmed by other observers, a distinct advance will have been made, for no other variety of stored blood has provided absolute safety in this regard. A. BAGDASSEROV of Moscow reports 2790 citrate transfusions of blood taken from living donors and stored for not more than 14 days with some degree of reaction in 65 per cent., and M. V. ALVEROV reports 76 transfusions with fresh stored blood used up to the tenth day with 60 per cent. of reactions, and 12 transfusions after the tenth day with 83 per cent. reactions. M. G. JEANNENEY of Bordeaux, however, has used stored blood up to the fifteenth day for 312 transfusions with only nine reactions, and at the Mayo Clinic, Rochester, 149 transfusions with stored blood used up to the twelfth day gave only 12·8 per cent. reactions. The wide variation in these figures may be explained by the varying conditions and duration of storage, the different preserving fluids used, and the extent of dilution of the blood. All these figures however, except those of JEANNENEY, represent a higher percentage of

[1] Goodall, J. R., Anderson, F. O., Altunas, G. T., and MacPhail, F. M., *Surg. Gynec. Obstet.* Feb. 1st, 1938, p. 176.

reactions than we associate in this country with the transfusion of fresh citrated blood, and until the reactions following the use of preserved blood can be reduced to a level that is within the 5 per cent. mark, it is likely to be used only in a real emergency. Perhaps the placenta will reduce this danger to negligible proportions.

PRIVILEGE BY INTEREST OR DUTY

Lord HEWART disposed of Miss MELLOR'S case in a very few words (under the circumstances set out on p. 859). The simple fact was that the Medical Defence Union had done no more than its duty in writing to her. This meant that the letters were, in the absence of malice, privileged. The question of privilege deserves perhaps a few words of explanation. Privilege, as a defence to an action for damages for libel or slander, can be either absolute or qualified. There are times when the interests of human society demand that a man should speak out frankly without anxiety about the consequences. Absolute privilege arises where a member of Parliament makes a speech in Parliament or where judge or jury, counsel, witness, plaintiff, or defendant speak in a court of law. This privilege is called absolute because even the existence of malice does not diminish it. Even if the words are spoken in personal ill-will, in anger, and without the slightest foundation, no action can be brought upon them. Qualified privilege arises through the existence of some duty or interest. As Lord CAMPBELL put it in Harrison *v.* Bush, "a communication made bona fide upon any subject-matter in which the party communicating has an interest, or in reference to which he has a duty, is privileged if made to a person having a corresponding interest or duty." The word "duty" here is not limited to legal duties but will include moral and social duties of imperfect obligation. The answer to a confidential inquiry is an obvious instance. Apart from such cases a man has a right to protect his own interests, and if the person addressed has some duty or interest in the matter, the occasion is privileged. Malice, as already indicated, can negative qualified privilege. Malice here has the sense of some wrong feeling in the mind. Forgetfulness, honest blundering, or genuine indignation are not malice; but vindictiveness, unwarranted violence of language, or statements made recklessly with a carelessness as to whether they are true or false—these may amount to malice. If the judge rules that the occasion was absolutely privileged, it is an end of the case. If he rules that there was a qualified privilege, then and not till then does any issue about malice arise. The plaintiff, of course, must prove the existence of malice. In Miss MELLOR'S case the letters of the Medical Defence Union enjoyed qualified privilege through duty and interest and there was no evidence of malice whatever.

ANNOTATIONS

THE CAUSES OF BLINDNESS

WITH the publication of its sixth report the voluntary committee on the prevention of blindness[1] brings its work to an end, for from now on its place will be taken by a standing advisory committee appointed by the Minister of Health. In the last six years the committee, under the chairmanship of Mr. P. M. Evans, LL.D., has issued five reports: on certification and examination of blind persons in 1932; on hereditary blindness in 1933; on the prevention of blindness in 1936; on cataract last year; and the present report, which is supplementary to that of 1936. The committee points out that in 1921 the total number of registered blind persons in England and Wales was 34,894, and that in 1936 this figure had risen to 67,521. It must be remembered, however, that, owing to increased benefits available to the registered blind, and to the improved methods of ascertainment and registration, a considerably larger proportion of the blind are now registered, and there is no real evidence of an actual increase in blindness. Since the publication of its 1936 report the committee has analysed over 6000 cases of blindness out of a total of about 20,000 for whom forms were forwarded for examination. As a proportion of cases could only be dealt with as single eyes and not as persons—for example, cases in which the cause of blindness was different in the two eyes—and for other reasons, the present report only comments on 5290 of these, and compares them with 2748 cases at the Glasgow clinic, which covers Glasgow and the south-west of Scotland, and 1000 cases at Birmingham. Two-thirds of the committee's series were over fifty at the time of examination. Cataract is shown to be the most prevalent cause of blindness (25 per cent.), and more than two-thirds of the 1300 cases considered are classed as operable. Glaucoma accounts for 11 per cent. and congenital, hereditary, and developmental defects for another 11. Of the latter a third are actually hereditary, and the examination of the pedigrees of a number of these which are in the possession of the committee might be of considerable value. Myopia is responsible for 10 per cent., of which 1·1 per cent. have detachment of the retina and 8·8 per cent. other fundus lesions. This very high proportion of fundus lesions suggests to the committee that some cases may have been included in which some other condition causing blindness happened to coexist with a myopic refraction. Local infection of the coats of the eye come next with 6 per cent., and then congenital syphilis with 5 per cent. In discussing the incidence of syphilis in relation to the Glasgow figures Mr. John Marshall states that it probably enters into the cause of blindness to a greater extent than the figures suggest, as the routine use of the Kahn test in 1500 cases of blindness which were diagnosed as due to other causes showed a positive reaction in 5·9 per cent. Acquired syphilis (2·83 per cent.) has an incidence comparable to that found in the clinic of an average out-patient department. Nearly 5 per cent. were due to ophthalmia neonatorum, but less than a fifth of these were born since the present public health regulations dealing with this disease came into force in 1914. Industrial trauma and disease accounted for 1·4 per cent. and non-industrial trauma for another 2·4 per cent. In some cases of industrial trauma the use of goggles or other protective measures would have prevented the acci-

[1] Report on an analysis of a preliminary classification of the Causes of Blindness, by the Prevention of Blindness Committee of the Union of Counties Associations for the Blind. Communications about this committee and its work should now be addressed to the Secretary, Ministry of Health, London, S.W.1.

dent, but some involved the head and occasionally the whole body, and the majority of non-industrial accidents were considered unavoidable. Over 6 per cent. of the cases were due to causes which lie outside the domain of the ophthalmologist from the point of view of treatment—vascular, renal, and cerebral diseases and diabetes in particular—and in this connexion the committee draws attention to a passage from its 1936 report: "After the early years blindness, apart from accidents, is often due to general disease, and the prevention of blindness to this extent becomes part of preventive medicine. For this reason alone it is highly desirable that persons with defects of sight should seek expert medical advice with a view to finding out whether the cause of such defects is some disorder of general health."

SOYA-BEAN MILK AT SHANGHAI

OF the 350,000 destitute Chinese in camps and elsewhere in Shanghai it is the children who take most harm from food deficiencies. According to a report received from the International Red Cross at Shanghai through the Lord Mayor's Fund for China, all the refugees suffer more or less from beri-beri, and an attempt is being made to prevent this by supplying them with soya-bean milk and cakes, which contain vitamin B_1. This milk is produced at one of the hospitals: the beans are soaked and then crushed in a mill run by a small motor, which could grind enough beans to give 15,000 lb. of milk in twelve hours; but at present only 6000–7000 lb. is made, for this is the limit of cooking facilities. The bean mash is mixed with water and slowly boiled, and the hot solution is delivered to the camps, where sugar and calcium lactate are added. One pound is allowed to one child each day and delivery is twice daily. There are, it is stated, about 15,000 children under six years of age in the International Settlement and French Concession to whom the bean milk is a necessity, but enough is available for only about 7000. The bean residue after milk production is mixed with its own weight of whole-wheat flour and baked into cakes by a firm in Shanghai at cost price. These cakes are distributed to 3200 children between the ages of six and twelve, who receive two each day. The total cost of this project is about 11,000 dollars, but would of course be far greater if the milk and cakes were made on a sufficient scale. The best that most of the Shanghai camps can do for their refugees is two meals a day of hot rice and a little vegetable, chiefly dried and salted turnip. Even to keep them supplied with this meagre diet will become desperately difficult during the next two months. Unless fresh funds can be raised the camps will be faced with something approaching mass starvation.

THE PHYSIOLOGICALLY CORRECT WAY TO WRITE

A STUDY of its history has convinced Dr. H. Callewaert[1] that handwriting through the ages has rightly tended to become cursive. Gothic handwriting was at least æsthetically justifiable, but the so-called "simple script," in which the letters composing a word are not linked together, is to be commended neither from the point of view of convenience nor of physiology. An antebrachial action, with the point of the elbow used as the pivot of rotation is, in Dr. Callewaert's view, the physiologically correct way to write, permitting of a large and practical range of movement of the forearm and hand working together, and of free movements of all the fingers. A carpo-radial action, though much less ample in scope, permits of relatively rapid writing in certain circumstances, but a carpo-cubital action, often found in combination with a carpo-radial, should be avoided. The digito-radial action is fluent enough at the end of the line, but is restricted in scope even when there is a good functional dissociation between the two parts of the hand as in a mixed digito-radial movement. Similarly in the auriculo-radial action there is limitation of range of movement because the action of the little finger is divorced from that of the other fingers. Any pronouncement by a medical man, of whatever country, on the subject of handwriting is likely enough to revive the age-old pleasantry on the illegibility of prescriptions, with the suggestion that of all people the doctor is least qualified to speak with authority on this subject. It is certain that though nearly all handwriting tends to become less formal and precise with the years, those who learnt in their youth to pen each letter separately remain on the whole more easy to read in later life. Perhaps the restrictions in the scope of arm and hand movements, deplored by Dr. Callewaert, play a part in the retention of relative legibility by those who started their writing in "simple script."

[1] Physiologie de l'écriture cursive. By Dr. H. Callewaert. Paris: Desclée, de Brouwer et Cie. 1937. Pp. 122.

FERTILITY OF THE EARTH

IN a mechanised age it may be difficult for townspeople to remember that all the food of the human race is obtained by the tilling of the earth or the harvesting of the sea. Improved transport and means of food preservation have combined to reduce the effects of crop failures, at least on those nations with sufficient means to buy abroad, so that, except in time of war, the townsman is inclined to look no farther than the butcher, the grocer, and the seller of what the late H. E. Armstrong called "cleaned up milk" for the supply of his daily food. It was therefore a wise move on the part of the Royal Institution to arrange for the delivery in the heart of London of a course of lectures on the fertility of the earth. Sir Frederick Keeble, whose eloquence completed the series, expressed some alarm at the deterioration of physique and fertility in the human race and at the decreasing fertility of the soil. He welcomed the development of grass farming at the expense of arable, but argued for the better cultivation and utilisation of grass, deploring the widespread use of concentrated cattle foods and the time-honoured method of preserving grass as hay. The specimen of artificially dried grass shown on the lecture table was as green as alpine hay, but it was difficult to assent to the view that lowland hay, when well made and stored, must lose so large a proportion of salts and protein as he suggested. A strong point, amply illustrated by numerical data, was the advantage of increasing the yield of grass by the proper use of fertilisers all through the year, enabling stock to spend more of their time grazing, and to graze on newly grown grass in which nutritious and growth-promoting constituents had not given place to fibrous matters of use mainly as "roughage." Most foodstuffs derived from land plants are, according to the lecturer, deficient in iodine and iron, whence arise lack of vitality and anæmia. His main thesis, however, was the desirability of fuller recognition of the dictum that "all flesh is grass" and of greater attention to the improvement of pasturage. Much more could be done in maintaining soil in fertile condition by better cultivation, keeping up its content of humus, and supplementing its available constituents by the judicious use of manures, including

lime in which so many soils are deficient. Another way of meeting the deficiency has recently been developed on a large scale in California, where soil has been discarded for growing plants, the requisite anchorage being obtained by sowing seeds on a mat of vegetable debris supported on wire netting over shallow trays containing dilute solutions of mineral salts, with ammonium salts or nitrates. By this arrangement the normal temperature difference of root top and leaves, with its rhythmic variation between day and night, can be maintained and the roots are free to grow in a solution in which the concentration of salts can be maintained constant or allowed to vary as desired. Enormous crops of such varied products as tobacco, lettuce, spinach, potatoes, and tomatoes can be obtained in this way and so far disease has not given trouble. This production by "hydroponics" is based on work done at the University of California.[1] Economic considerations may restrict the development of methods of this kind, except perhaps for luxury products. Meanwhile it is much to be desired that the productivity of the soil of "this blessed plot, this other Eden" should be so increased (as it could be) that, in times of peace as well as under stress of war, our basic industry may not only flourish but furnish us with most of our food, allowing other lands to send us those products which we appreciate but cannot grow.

MEDICINE IN COLONIAL PHILADELPHIA

Elizabeth Sandwith Drinker, the second wife of a prosperous Quaker merchant in colonial Philadelphia, kept a diary from 1758 until shortly before her death in 1807. Within this volume[2] her great-great-grandson has included and annotated such excerpts from this diary as are primarily of medical interest. Here is to be found a vivid account of appalling sanitary conditions, constantly recurring epidemic disease, and incompetent midwifery which should make salutary reading for those who yearn for the good old days. The Drinkers were in a financial position to command the professional services of the best doctors of the time, among whom were Rush (and his arch-enemy Kuhn), Shippen, Bond, and Physick. Nevertheless, only five of their nine children reached maturity and, despite the attentions of the younger Shippen, who had worked under McKenzie and the Hunters and was regarded as the best obstetrician in the colonies, Elizabeth herself was reduced to a state of permanent semi-invalidism as a result of her numerous and stormy confinements. She accepted her fate philosophically and devoted her energies to the care of her family and dependants, becoming an amateur doctor of great good sense. Small-pox, bacillary dysentery, typhoid, malaria, and yellow fever all flourished either sporadically or epidemically within the colony during the period of the diary, and were faithfully recorded therein by this good wife and mother, who was obviously a person of character with plenty of ideas of her own. Thus when a child swallows a pin, she is not afraid to treat it by giving raw eggs, observing that "it is admirable that so few bad consequences follow—it slips down the common sewer, with other things, and kind Nature often eludes calamity." But when two of her children, William aged 38, and Nancy 41, go out in search of ice-cream, she is not amused. "The eating iced cream, or going to the ice'd cream house are two acts neither of which I admire or approve." Yet she was "modern" enough to approve of baths and when a shower-bath was installed in her own back-yard she gallantly went into it and bore it better than she expected, "not having been wett all over at once, for 28 years past." This is a book brimful of "atmosphere" which presents a lively picture of the times.

[1] See Gericke, W. F., *Nature, Lond.* March 26th, 1938, p. 536.

[2] Not So Long Ago. By Cecil K. Drinker, M.D., Sc.D., Professor of Physiology and Dean of the School of Public Health, Harvard University. London: Humphrey Milford, Oxford University Press. 1937. Pp. 183. 15*s*.

PSYCHIATRIC CLINICS IN GENERAL HOSPITALS

In spite of increasing recognition that physical and mental diseases are interrelated and that their treatment is inseparable, the psychiatric departments which have arisen in general hospitals have mostly been confined to out-patients, and at the present moment there are not more than a dozen beds for mental patients in the London teaching hospitals, and these are mainly intended for the observation of mild borderline cases. Most of the objections can be overcome by the institution of special psychiatric wards or in-patient clinics and no doubt this is the way that development will ultimately take place. In 1931, according to the records of the International Hospital Association,[1] there were 7 such clinics in Germany and 2 in Denmark, and there are now 78 in the United States and 4 in Canada. In England one of 42 beds for patients of moderate means is to be erected at Guy's Hospital as an addition to the six beds at present provided in the general wards, and St. George's Hospital hopes to include a psychiatric clinic with 50 beds in its rebuilding scheme. The Middlesex Hospital already has 6 beds allocated to psychiatry. The advantages of these clinics are numerous. Patients can be admitted to them without the stigma of having been sent to an asylum, and for this reason they and their relatives will agree to early admission more readily. In a general hospital they will have the benefit of full equipment for physical diagnosis and the services of specialists in other branches of medicine and surgery. The staff of the hospital may well gain in breadth of outlook by closer contact with psychiatrists and may find that a period of observation in the clinic will often take the place of an exploratory laparotomy, a focal infection operation, or other forlorn hopes. It is to students, however, that such a clinic within their medical school offers most. The present system of occasional demonstrations at a distant mental hospital gives little encouragement to even those few students who feel naturally attracted to psychiatry, and leaves the average student (as we have before remarked [2]) with an impression comparable to that obtained from a series of visits to the Zoo. Dr. Harvey Agnew, secretary of the department of hospital service of the Canadian Medical Association, suggests [3] that psychiatric clinics should be designed to admit patients for periods up to three months, and that admission to them should be as informal as possible. He favours special wards rather than an isolated building to allow easy transfer to and from the general wards. About four-fifths of the accommodation should be in single rooms and the remainder in wards of not more than four beds. The rooms should be built on the vacuum flask principle so as to be almost soundproof, and the windows should have small panes of unbreakable glass and steel frames with a small opening, thus doing away with the need for bars. There should be sitting-rooms for male and female patients and a small hydrotherapy department. The neuropsychiatrist in charge of the clinic should be a member of the hospital staff and he

[1] Alter, W., *Nosokomeion*, 1931, **2**, 409.

[2] *Lancet*, 1937, **1**, 875.

[3] *Nosokomeion*, January, 1938, p. 13.

should be assisted by a psychologist and one or more medical officers, a qualified hydrotherapist, and an ample supply of specially trained nurses and orderlies. His report carried weight when it was presented last year at an international congress in Paris.

NARCOSIS IN OPHTHALMIC SURGERY

Basil Graves has recently drawn attention[1] to the state of shock induced in some elderly persons who have to face an ophthalmic operation performed under local anæsthesia. This shock has been blamed for subsequent restlessness, delirium, flatulence, abdominal discomfort, and even death, and its avoidance is often attempted by inducing a "surgical narcosis" which ranges from a placid mental acquiescence to full unconsciousness. Such drugs as morphia, Omnopon, scopolamine, paraldehyde, Avertin, Nembutal, sodium Evipan, and sodium Pentothal have been used for this purpose. Unfortunately, however, many of these may endanger the success of an ophthalmic operation both during its performance and afterwards. The opium derivatives are liable to cause vomiting and abdominal discomfort in patients who have an idiosyncrasy to these drugs. Paraldehyde has been known to produce a state of muzziness and restlessness for a couple of days after operation. Avertin often has to be supplemented by inhalation anæsthesia, and its use has been followed by retching, nausea, vomiting, and restlessness. Nembutal is valuable in some cases, for it may produce a placid tranquil state without loss of coöperation; but its effect is variable, and a dose without apparent effect on some persons may in others give rise to a restlessness that makes it impossible to perform an operation on the eye. Sodium evipan administered intravenously must be supplemented by local anæsthesia, and its injection is sometimes followed by sneezing, head-raising, and jactitations, which would be disastrous in intra-ocular surgery. The latest preparation in this field, sodium pentothal, seems to have none of the disadvantages of sodium evipan, for the induction, anæsthesia, and recovery to consciousness are smooth and uneventful. So far as present experience goes, it appears to be a satisfactory anæsthetic for patients who are unlikely to coöperate properly, or whose eyes are congested and painful.

SECRETIN

Often a long time elapses between the discovery of a physiological fact and its application to clinical medicine. The delay commonly arises from failure of the laboratory worker or the clinician (or both) to appreciate the usefulness of the new information. This is not the reason, however, for the interval between the discovery of secretin by Bayliss and Starling, in 1902, and the first successful attempts to make clinical use of it, in 1936. The possibilities of the hormone, in diagnosis, therapeutics, and human physiology, have been more or less clearly recognised for many years, but the preparations hitherto available have not been pure enough to permit their routine use in the human subject. A few studies have been made, it is true, but all have been hampered and restricted by unwanted side-reactions, of varying severity, caused by toxic substances contaminating the preparations. Unfortunately secretin is ineffective if given by mouth or subcutaneously; it must be injected intravenously. The difficulty has now been overcome, however, by the work of Agren and Lagerlöf,[1] who have produced both pure crystalline secretin and an amorphous non-toxic preparation which is commercially available.[2] The amorphous substance is not so active as crystalline secretin, but it is sufficiently powerful to be of great service in the investigation, and possibly treatment, of pancreatic and hepatic disturbances in man. Agren and Lagerlöf have already studied the pharmacological activity of their preparation and utilised it to devise tests for pancreatic and biliary function. Their results indicate that the response of the pancreas to a standard injection of secretin is constant within surprisingly narrow limits; that secretin has relatively little stimulant action on the formation of pancreatic enzymes, but causes the secretion of the alkaline fluid vehicle (a result in agreement with animal experiments); and that under certain conditions pancreatic diastase may be diminished whilst the trypsinogen content of the pancreatic juice is unaltered. These results await confirmation. Now that a pure enough preparation of secretin is available there should be a rapid advance in the clinical study of pancreatic function, not overlooking the possible therapeutic applications.

"ALCOHOLIC" BERI-BERI

Elsewhere in this issue Dr. Price describes a remarkable case of heart failure with polyneuritis in which recovery followed administration of vitamin B_1. Alcoholism and a deficient diet were outstanding features and from his studies of the state of the heart and nervous system Price feels justified in naming the disease beri-beri. In recent years the curative effect of vitamin B_1 in alcoholic neuritis has been repeatedly reported. American workers have played a leading part in this work, and Goodhart and Jolliffe[3] from their experience emphasise the importance of giving large quantities of the vitamin by injection. They find that a daily intravenous injection of 10 mg. of crystalline vitamin B_1 greatly hastens the rate of recovery. Unfortunately, as they point out, there has hitherto been no convenient chemical procedure for estimating the degree of vitamin-B_1 saturation in the body, and without such a test the exact value of the therapy can only be estimated roughly by observing the effect of treatment. Dr. L. J. Harris,[4] however, gives us reason to hope that such a test will soon be established. Vitamin-B_1 deficiency is probably commoner in this country than is generally realised, though the major clinical manifestations seem to be rare. Certain cardiac disorders and conditions in which there is loss of appetite are probably associated with this deficiency and there is reason to advise intensive administration of the vitamin in all forms of polyneuritis except perhaps acute infective polyneuritis which seems to be unaffected by it. Some also hold that the nervous complications of pernicious anæmia should be treated with injections of vitamin B_1 as well as with liver extracts,[5] and this view is supported by recent reports from Germany. Zettel,[6] for example, has had good results from injection in cases of subacute combined degeneration of the spinal cord which had failed to respond to adequate liver treatment

[1] *Brit. med. J.* 1937, **2**, 319.

[1] Agren, G., and Lagerlöf, H., *Acta med. scand.* 1936, **90**, 1 and 224; 1937, **92**, 359. Hammarsten, E., Agren, G., and Lagerlöf, H., *Ibid*, 1937, **92**, 256.

[2] Sold under the name of Pancreotest by Aktiebolaget Astra, of Södertälje, Sweden.

[3] Goodhart, R., and Jolliffe, N., *J. Amer. med. Ass.* Feb. 5th, 1938, p. 414.

[4] Harris, L. J., Leong, P. C., and Ungley, C. C., *Lancet*, March 5th, 1938, p. 539.

[5] Russell, W. R., *Edinb. med. J.* 1936, **43**, 315.

[6] Zettel, H., *Münch. med. Wschr.* Feb. 18th, 1938, p. 254.

and in one case where large doses of vitamin B_1 by the mouth had had little effect.

Cowgill,[7] in summarising present knowledge of the physiology of vitamin B_1, points out that the organism's ability to store this vitamin is limited; in the pigeon and in the dog, the time taken for a shortage to become evident is about ten days and four weeks respectively. There is no conclusive evidence that lack of vitamin B_1 produces any specific dysfunction of the alimentary canal, but anorexia is a striking symptom of deficiency produced experimentally. The vitamin has likewise no specific action on the normal heart, but the beri-beri heart often returns to its normal size in a remarkably short time under its influence. Referring to the rôle of vitamin B_1 in metabolism, Cowgill says that the administration of thyroid extract increases the amount of the vitamin required, and that it is easier experimentally to produce symptoms of B_1-deficiency when a high-carbohydrate diet is given, while a high-fat diet lessens the need for the vitamin. The relation of vitamin B_1 to carbohydrate metabolism indicates that its action is generalised and not confined to certain organs or cells.

We take this opportunity of referring our readers to a valuable group of papers on beri-beri contributed at a meeting of the Royal Society of Tropical Medicine and Hygiene by Prof. R. Brunel Hawes, Prof. R. A. Peters, F.R.S., and Dr. B. S. Platt. These papers, with the subsequent discussion, are published in the March issue of the *Transactions* of the society.

CEREBRAL DAMAGE AFTER NITROUS OXIDE ANÆSTHESIA

NOT long ago we threw doubt on the assumption that nitrous oxide was to blame for certain cerebral lesions found in the brains of persons who had died some time after inhalation of this gas.[8] Our doubts were based on the fact that in every instance there had been prolonged failure of respiration during the operation. We have never seen evidence of such lesions after inhalations of nitrous oxide that were unaccompanied by respiratory trouble or some other complication for which the gas was not responsible. The observations of Courville [9] provide strong support for our opinion, for he definitely assigns to asphyxia the histological lesions that had been attributed to nitrous oxide. He begins by discussing the narcotic action of nitrous oxide and shows that the gas inevitably causes a certain amount of anoxic anoxæmia—i.e., anoxæmia arising from lowering of oxygen tension in the blood, as contrasted with other forms of anoxæmia due to deficient hæmoglobin or to slowing of the circulation. He points out that absence of cyanosis does not necessarily mean absence of anoxæmia. Finally he discusses and illustrates the histological lesions (vacuolation, enlarged pericellular spaces, isolated areas of necrosis, and subtotal destruction of cortex) that have been found in the brains of persons dying some time after an inhalation of nitrous oxide attended by unusual symptoms or respiratory failure. His conclusion is that the cerebral damage is a direct consequence of asphyxia, even though the respiratory stoppage may have been due to the depressant (narcotic) action of the gas on vital centres. Where there has not been cardio-respiratory failure cerebral damage is "probably the result of prolonged accumulative anoxemia of a dangerous degree, due to inherent predisposing factors in the patient (alcoholism), to defects in apparatus, to impurities in the gas or perhaps at times to improper administration of the anesthetic."

[7] Cowgill, G. R., *J. Amer. med. Ass.* March 12th, 1938, p. 805. Special articles on the chemistry of vitamin B_1 and on the pathology of beri-beri have lately appeared in the same journal (March 5th and 19th).

[8] *Lancet*, 1937, **2**, 1325.

[9] Courville, C. B., *Ann. Surg.* March, 1938, p. 371.

THIS CONTRACEPTIVE BUSINESS

THE manufacture and sale of contraceptives in this country and elsewhere have developed into an extensive industry. In the United States for instance it is stated on good authority [1] that the profits of the manufacturers alone amount to $75 million a year, while condoms which can be made for 1½ cents apiece are sold by druggists at 1800 per cent. profit. One English firm is said to turn out 8,500,000 appliances a year, and home production is reinforced by large imports from abroad. Neither manufacture nor sale is subject to any legal control. Standards for both chemical and mechanical products have been drawn up by the National Birth Control Association and the Birth Control Investigation Committee, and their value is being gradually recognised by manufacturers, medical men, and public, and in the United States it has been ruled that since such articles are sold for the prevention of venereal diseases their standards of quality are subject to the same scrutiny as those of drugs. Women in the United States are said to spend $200 million a year on mechanical devices, jellies, powders, and liquids sold "for feminine hygiene" and advertised as being "sure, safe and dependable." Many women are led to believe that this dependability refers to contraceptive properties when in fact there is not one product which is invariably safe when used alone.

Retail conditions are even more unsatisfactory. The underhand atmosphere which surrounds the sale of contraceptives has put it largely into the hands of the less reputable traders. An increasing number of shops show contraceptives in their windows with flamboyant illustrations and descriptions; such methods as street trading, sale in slot machines, and the circularising of engaged couples are increasingly resorted to. Four years ago Lord Dawson sponsored a Bill in the House of Lords which made it an offence to offer contraceptives for sale in a public place or in an automatic machine; to go to a person's home to sell contraceptives without his request; to display contraceptives or pictures or descriptions of them in shop windows; or to circularise unmarried people under 18 years with contraceptive information. A Bill in very similar terms has now been introduced in the Commons by Mr. R. J. Russell (see p. 866), and this seeks also to prohibit the sale of appliances to persons under 18 years. This prohibition was avoided by Lord Dawson on the ground that attempts to dragoon youth defeat their own object. Unless the attention of the healthy youth is forcibly drawn to such things and their sale is pushed upon him it is probable that with few exceptions he would not obtain them.

Summer Time will commence in Great Britain, Ireland, the Channel Islands, and the Isle of Man on Sunday morning next, April 10th, at 2 A.M., when the hands of timepieces should be advanced one hour. It will end on Sunday, Oct. 2nd. Summer time in France began a fortnight earlier.

[1] According to *Fortune* for February, 1938, quoted by *J. Amer. med. Ass.* 1938, **110**, 513.

SPECIAL ARTICLES

EPIDEMICS IN SCHOOLS

SEVEN years ago the Medical Research Council appointed a committee to investigate epidemic and other illness in schools from both scientific and practical standpoints. The first report of this School Epidemics Committee,[1] which has just been issued, deals in great detail with the sickness recorded during a period of five years, 1930–34, in 21 boys' and 10 girls' schools. These schools were predominantly public and boarding-schools attended mainly by children of the "middle" or "upper-middle" social classes. The total number of children in the inquiry was 22,166 boys and 7600 girls, varying in their individual period of observation from 1 to 15 terms and in their age from 10 to 19 years. For each of these pupils particulars were obtained from the schools of all absences due to illness for one day or more, in addition to some information on the past medical history. The results have been analysed in terms of causes of sickness, seasonal incidence, sex and age differences, secular trends, and many other factors.

SEX DIFFERENCES

One of the most striking sex differences is in the recorded incidence of nasopharyngeal infection. The average number of boys attacked during a term by such causes (including influenza) was 17·4 per cent. of the total population, of girls 38·9 per cent., or more than twice as many. It is from the diagnosis "cold" that most of this difference arises, with attack rates of 22·6 per cent. on the girls and 5·6 per cent. on the boys. It is clearly not unlikely that the excessive incidence of the girls may be the result of a stricter surveillance and readier removal from school rather than of a real sex difference in susceptibility. The same difficulty arises in interpreting the declining attack rates from nasopharyngeal infections as age advances. That may be a process of natural immunisation or only the result of a younger child being kept out of school on account of a cold more frequently than an older child with a similar attack. A more secure basis is reached with serious infections such as otitis media, pneumonia, acute rheumatism, &c., and here also there are some large sex differences in incidence. The boys suffered twice as frequently as the girls from otitis media, two and a half times as frequently from pneumonia, and eleven times as frequently from acute rheumatism (the last is based upon rather limited figures). These differences in serious illnesses may be derived, at least in part, from the stricter supervision of the girls, already mentioned, which would lead to their being kept out of school more frequently for minor infections and isolated at an earlier stage of illness. In girls' schools there is also, probably, less close contact in the sleeping accommodation. At present the committee is not prepared to interpret these observed differences but stresses the importance of discovering the underlying causes.

[1] Medical Research Council, Special Report Series No. 227. H.M. Stationery Office. Pp. 289. 4*s*. 6*d*. The committee was made up as follows: Sir George Newman (chairman 1930–35), Sir Arthur MacNalty (present chairman), Dame Janet Campbell, Dr. R. H. Crowley, Sir Weldon Dalrymple-Champneys, Surgeon Rear-Admiral S. F. Dudley, Dr. G. E. Friend, Dr. J. A. Glover, Prof. M. Greenwood, F.R.S., Dr. F. Griffith, Dr. L. R. Lempriere, Prof. W. W. C. Topley, F.R.S., Dr. Joyce Wilson (secretary).

COLDS

The weekly attack rates from nasopharyngeal infection show, with a fair degree of regularity, a rise to a maximum in the third or fourth week of the term, followed by a rapid fall, and then a tendency to a second but less important rise at about the tenth week. A possible explanation is a loss of immunity in the holidays, followed by an epidemic of colds under the renewed contact and exchange of nasopharyngeal flora on return to school; a temporary immunity thus results but wanes in time for a second outbreak towards the end of the term. By comparing the records of boys in six schools an attempt was made to see whether those who had suffered heavily from colds at one age caught more or less colds at a later age than their fellows whose earlier experience had been more favourable. No influence of previous upon subsequent experience could be found, and the subsequent history of boys who in any one term had had two or more colds was also not materially different from their experience before the term in which the multiple colds occurred.

INFLUENZA

A similar type of comparison can be made of boys who passed through two epidemics of influenza. It was found that those boys who contracted influenza in the first epidemic were more, not less, likely than their unattacked companions to contract the disease when again exposed to risk a year later. On the other hand, figures for an epidemic in the first term of 1932 showed a considerably lower attack rate (7·95 per cent.) on those who had been attacked in the previous Christmas holidays than on those who had escaped attack in the holidays (23·09 per cent. attacked in the term). A tentative explanation is that the attacked belong to a more susceptible class and are therefore more frequently attacked than their more resistant companions, in a later epidemic, taking place at least a year later than the first epidemic; but for a short interval of time they have a transient immunity conferred by the attack. In the influenza epidemics observed girls showed far less tendency than boys to develop such complications as otitis, sinusitis, and pneumonia.

COMMON FEVERS

The medical histories of previous experience show that, broadly, about 70 per cent. of the boys had had measles, chicken-pox, and whooping-cough before entry to the schools, about 30 per cent. had had german measles and mumps, and less than 10 per cent. scarlet fever. The corresponding figures for the girls are rather lower but of the same order. Of those attacked during school life the Lent term provides the most formidable number of cases, closely followed by the summer term. The Christmas term rarely produced cases of infectious disease. The maximum number of outbreaks began in the third–fourth weeks for the boys, the second–third weeks for the girls. It seems probable that such early outbreaks were introduced by a child infected at the end of the holidays and subsequently falling ill, but the possibility of carriers, particularly for scarlet fever, must be borne in mind.

A remarkable fact is the inability of a high proportion of outbreaks to spread at all. Limiting observation to outbreaks which had time to spread before the end of term, it is found that 34 per cent. in boys' schools and 41 per cent. in girls' schools were limited

to one case. Similarly there is much variability between one epidemic and another and between one school and another. For instance, with measles the proportion attacked of susceptibles (no history of previous attack) varied from 12 to 70 per cent. Examination of seven pairs of epidemics of this disease gave support to Stocks's observations on the acquirement of a transient immunity without exhibition of a clinical attack. Children who had passed unscathed through one epidemic were more likely to escape attack in a second epidemic than those who had not been exposed to the first risk. There is some evidence of the same phenomenon, but on a lower scale, in german measles. This disease exhibited sometimes powers of spread equalled only in the present data by influenza, the cases tending to occur in two or three well-defined waves. Although approximately the same percentage of children had before entry passed through an attack of measles, chicken-pox, and whooping-cough, the commonest disease in boys and girls was chicken-pox, both with regard to the number of times it appeared and the absolute frequency with which it spread to the extent of causing an attack rate of 1·0 per cent. or over. Whooping-cough, on the other hand, was a comparatively unimportant disease and the number of cases relatively trivial. In accordance with past observations girls appeared to be more liable to attack than boys.

Although the proportions attacked by mumps before entry were low the disease showed no distinct tendency to spread widely, an observation which is still more striking with scarlet fever, which showed less inclination to spread than any other infectious disease except diphtheria. A large sex difference is also here shown. The boys reported 271 cases of scarlet fever, the girls only 27. Allowing for the fact that boys outnumbered girls in the ratio of 3 to 1 we might expect 81 cases among the girls. In other words the boys reported more than three times as many cases as the girls, a sex difference for which no explanation is forthcoming. In general these data on the infectious diseases suggest, as one would expect, that the chance of one of them gaining access to a school is dependent, in part at least, upon the size of the population. Another observation of interest is the considerable difference between the infectious diseases in their ability to work themselves out before the end of term. About half the outbreaks of measles came to a natural conclusion, while no epidemics of german measles and only a small proportion of mumps, chicken-pox, and scarlet fever could be said to have ended before the holidays began. With an almost unlimited supply of susceptibles outbreaks of german measles, mumps, and scarlet fever might well be expected to drag on, but the difference between the behaviour of measles and chicken-pox is odd since the proportion of susceptibles to these two diseases was approximately the same—about 30 per cent.

OTHER DISEASES

Gastro-intestinal disorders show their highest incidence—43 per cent. of their total—in the Christmas term, the remainder being fairly equally divided between the Lent and summer terms. Another cause of school absence with a high incidence for boys in the Christmas term was trauma, which produced in total—i.e., on the figures for the whole year—9·4 per cent. of all lost time among boys and 4·8 per cent. among girls. In the Christmas term the figure for the boys rose to 17·8 per cent., or about half a day per pupil, while with the girls there is no pronounced seasonal change. Epidemic catarrhal jaundice was encountered on a large scale at two schools and fairly frequently when confined to but one or two cases. The available evidence confirms Pickles's conclusion that it has a rather long incubation period, three to four weeks or even longer. Its incidence was low in the summer term and also fell nearly three times as heavily on boys as on girls. In the Lent term of 1934 epidemic conjunctivitis became widespread and caused a considerable amount of lost time in both boys' and girls' schools. Ringworm of the scalp or body was rarely reported but there was a fairly wide prevalence of tinea cruris, the incidence of which most medical officers think has increased since the war. In the present experience 40 per cent. of the cases fall in the summer term and it was found that on the whole the schools which isolated patients until cured suffered lower attack rates than those which permitted school attendance during treatment.

TIME LOST

Taking all causes of illness together we find that in the boys' boarding-schools 3·2 days were lost per boy per term, in the girls' boarding-schools 3·8 days. In the former variations between schools were from 5·1 to 2·2 days, in the latter from 4·3 to 3·0. Colds and influenza added together accounted for 53 per cent. of time lost by the girls and for 43 per cent. of time lost by the boys. All rates except those for trauma tended to decline with advancing age, as one might expect as the result of increasing herd immunity. Bacteriological work carried out on behalf of the committee by Dr. F. Griffith of the Ministry of Health leads to some interesting epidemiological observations. He found that in one school, during a period of four years, there were six separate invasions by different types of hæmolytic streptococci, each type appearing suddenly and gradually dying out, leaving behind a few chronic carriers. Does the disappearance of an epidemic strain from such a community mean that those susceptible to infection with this type had been attacked or become insusceptible through a concealed infection? Does the particular strain lose its invasive properties and become unable to infect and produce disease in normal throats though present in the chronic carriers? The great majority of these streptococcal outbreaks occurred in the Christmas and Lent terms and the summer term and the summer vacation appeared to interpose a barrier to the extension of types then present.

ONLY A BEGINNING

Such in short are the data that the committee has accumulated and analysed. At present they have made no attempt to establish correlations between particular sickness rates and particular environmental factors which might be altered or controlled. For the interpretation of seasonal variations, sex differences, and school differences they regard their data as still too few. Their inquiry is proceeding and it is the committee's intention to continue the collection of these sickness records on a somewhat more restricted scale while investigating in greater detail the problems which the present facts have stressed. If, for instance, the present differences between schools are found to be repeated over a further period of years, then it would be reasonable to regard them as real differences dependent upon environmental factors which detailed inquiries might detect. The committee also proposes to correlate growth rates of pupils, as measured by gain in weight,

with the sickness incidence experienced. The conclusion is that "by continuing the inquiry over a much longer period, so that significant differences or trends can be distinguished from those that are transient and random, and by following up particular problems, it should be possible, at least, to lay a foundation of well-documented evidence that will serve as a basis, certainly for further studies, and possibly for administrative action."

AUSTRALIA

(FROM OUR OWN CORRESPONDENT)

THE ELIZABETH KENNY METHOD

FOR some years Miss Elizabeth Kenny has been practising in Queensland a method devised by herself for the treatment of paralysis, and has roused both public opinion and medical interest with her optimism about the effects of her treatment. Two years ago a Royal Commission was appointed by the Queensland State Government at Miss Kenny's request to inquire into her method, and the report of the Commission has now been issued. The terms of reference were to investigate the modern methods of treatment of infantile paralysis, and other diseases of a paralytic nature, and to investigate in particular the Elizabeth Kenny method of treating infantile paralysis, spastic paralysis, and birth palsy, and to compare the results of this method with the results of orthodox treatment. The personnel were selected by Miss Kenny. The main conclusion reached is that the method differs essentially from current practice in only two points—the early movement of the limb during the stage of muscle tenderness, and the refusal to accept the principle of supporting every paralysed muscle by suitable splinting.

Miss Kenny has certainly had some measure of success with her work at the several clinics established in Queensland, but it is felt by the Commission that this is due to the intensity rather than the nature of the treatment. She has been liberally supplied with Government funds totalling approximately £25,000, which has allowed a large staff and consequently frequent attention. The Commission see no reason to doubt that given the same intensity of treatment orthodox methods would have produced equal or even better results, and that some of the patients who became worse would not have done so under orthodox treatment. As to the psychological aspect, Miss Kenny lays down as one of her fundamental principles the maintenance of a "bright mental outlook," and she develops this to the utmost. The clinics are equipped with porcelain baths, colourful appointments, uniformed trainees, and free transport is arranged; and patients converse with each other in an optimistic and cheery atmosphere. Furthermore, the Commission note that the dominant figure of Miss Kenny herself, her strong personality, her own conviction of competence, and promises of cure—all tend to create an atmosphere generative both of faith and hope, and particularly of loyalty to Miss Kenny.

While conceding credit to Miss Kenny for drawing attention to the plight of crippled children, and for her effort to secure organised treatment of cripples, the Commission feel that an exaggerated status has thereby been given to infantile paralysis in popular opinion, to the exclusion of other crippling conditions that may benefit more largely and more permanently by a similar expenditure of Government funds.

TRUBY KING

The death of Sir Truby King, famed for his child welfare work and founder of the Plunket scheme of mothercraft and child welfare, recalls the difficulties he had 30 years ago in overcoming the accusations levelled against him of being a crank and a fraud. His first interest in baby welfare was developed through his successful work among dairy calves on the farm belonging to the mental hospital of which he was then superintendent. He found that, by instituting a system of "rational, scientific, artificial feeding" for the calves, based on the percentage composition (and in particular the protein ratio) of average cow's milk, he was able to eliminate completely death from "scouring" among the calves. So successful were the experiments with calves that Sir Truby applied the same system of percentage feeding to human infants, using human milk as a standard instead of cow's milk. The results obtained were remarkable and within a few years mortality from diarrhœa in New Zealand was reduced to practically nothing; and within a few more years his method of feeding had adherents all over the civilised world.

THE CIVILIAN POPULATION AND CHEMICAL WARFARE

The New South Wales Post-Graduate Committee in Medicine recently arranged for a course of four lectures, dealing with the protection of the civil population against gas attack, to be given on the following subjects: chemical warfare and the general requirements of a civilian gas defence scheme; physiological effects of war gases and first-aid treatment for gas casualties; blister gases—individual and collective protection; material decontamination; organisation, scope, and control of air-raid precautions; and first-aid services. A number of similar lectures have been delivered recently in scientific and military circles, dealing with the education and protection of the public against gas attacks in warfare. The problem of producing a satisfactory and workable civilian gas defensive scheme is not an easy one to solve; but the more that people generally understand what must be faced, the easier it will be to secure coöperation for such a plan and to reduce panic in time of emergency. At present supplies of anti-gas respirators and protective clothing are available only for members of the police force, essential services, and for members of military organisations. The best form of protection for the population at large is to ensure that they remain indoors during the progress of a raid and until the all-clear signal is given.

PARIS

(FROM OUR OWN CORRESPONDENT)

THE CHEMOTHERAPY OF GONORRHŒA

THE conference of experts in gonorrhœa just held at the Ministry of Public Health under the auspices of the Conseil Supérieur d'Hygiène Sociale devoted nearly all its attention to the treatment of gonorrhœa with sulphanilamide et hoc genus omne. One purpose of this conference was to clear the air in preparation for the general meeting of the International Union against Venereal Disease to be held this month. Prof. Gougerot presided over the conference, which was attended by Prof. Levaditi, Prof. Janet, and many others whose names are familiar in association with chemotherapy or gonorrhœa. The conference will be resumed in December. The practically

unanimous conclusions to which it came last month were that the sulphonamide group promises to achieve a very appreciable advance in the treatment of gonorrhœa, but that the risks of serious poisoning are so great that indiscriminate medication by the public without medical control is to be emphatically deprecated. This latter point was underlined at the end of the conference by the unanimous adoption of a resolution to the effect that the sulphonamide group of drugs should be considered as toxic, and that a limit should be put to the duration of their prescription. At present, these drugs can be bought in France without a prescription, and in order to protect the public from the dangers inherent in this state of affairs one speaker suggested that the dosage should not be indicated on the wrappings, and that they should give a warning as to the possibilities of poisoning. In this connexion it may be noted that one speaker had found 50 per cent. of his patients show some slight degree of intolerance, and 10 per cent. more alarming signs such as severe headache with giddiness, intense cyanosis, anæmia, or neutropenia.

POST-GRADUATE LECTURES IN ENGLISH

Prof. H. Hartmann, president of the Association pour le Développement des Relations Médicales entre la France et les Pays Etrangers, has drawn up a very attractive programme of post-graduate lectures to be given in English by leading members of the French medical profession during the latter part of June and the first half of July. These lectures will be given either at the Faculté de Médecine or in the Paris hospitals. The subjects dealt with will be cardiology, ophthalmology, gynæcology, endocrinology, pædiatrics, neuro-psychiatry, dermatology, histology (at the Cancer Institute at Villejuif), medico-surgical physiology, urethro-pyelography, abdominal surgery, and operations on the cadaver. Further details may be obtained from the bureau of the association, Salle Béclard, Faculté de Médecine, Paris VI.

IRELAND

(FROM OUR OWN CORRESPONDENT)

AN ACTION FOR DAMAGES

RESERVED judgment was delivered in the Supreme Court last week in a case in which a boy of 10, suing by his father, appealed from a judgment of Mr. Justice O'Byrne in favour of Dr. Mary Byrne, whom he had sued for damages, alleging negligence in her medical and surgical treatment of him while she was resident medical officer in the County Hospital, Wexford, in 1936. The defence was a denial of negligence and a plea that the action, not having been begun within six months after the alleged neglect, was debarred by the Public Authorities (Protection) Act, 1893. Despite expert evidence that the treatment—the setting of a broken arm—was skilfully and carefully given, the jury found for the plaintiff and assessed damages at £400. The judge, however, was satisfied that Dr. Byrne was protected by the Act referred to, and directed judgment for her. The Supreme Court unanimously upheld this judgment. Mr. Justice FitzGibbon, who read the judgment of the court, said that without doubt the Wexford board of health, if they had been made defendants in the case, would have been entitled to rely upon the Public Authorities (Protection) Act. The duty to provide and maintain a hospital at Wexford for the treatment of medical, surgical, and maternity cases among persons in the county eligible for relief was a public duty imposed by statutory authority on the board of health. In making these provisions the board was acting in the execution of a public duty. That public duty could only be carried out by the board through the agency of subordinate officers, and such subordinate officers were entitled by statute to protection against actions for neglect or default in the execution of the duties entrusted to them by the board. The defendant, in his opinion, was acting in the execution of these public duties, and the alleged neglect or default with which she had been charged was committed, if at all, in the execution of such public duty.

MEDICAL MEMBERS OF THE NEW SENATE

The Senate of Ireland, for which the elections and nominations were completed last week, will contain four members of the medical profession. One was elected on the cultural and educational panel, one was returned by each of the universities, and one was nominated by the President. Dr. Patrick Joseph Doyle of Shinrone, Offaly, who was elected on the cultural and educational panel, is dispensary medical officer of the Shinrone district, and will be the only member of the dispensary service in the Senate. Dublin University elected as one of their representatives Dr. Robert J. Rowlette who formerly represented the same constituency in the Dáil. He is King's professor of materia medica and pharmacy in the School of Physic. The National University of Ireland elected Mr. Henry L. Barniville, professor of surgery in University College, Dublin. He was a member of the former Senate from its foundation to its abolition. The President nominated Dr. Robert P. Farnan, professor of obstetrics and gynæcology in University College, Dublin, and president of the recently formed Medical Research Council. Both Dr. Farnan and Mr. Barniville are members of the staff of the Mater Misericordiæ Hospital.

LONDON M.B., B.S.: NEW REGULATIONS

THE differences between the revised regulations for the London M.B., B.S., just issued, and those now in force are more fundamental than may appear at first sight. Perhaps the most important of the changes from the student's point of view is the division of the "final" into three instead of two parts, which will not only make the examination less formidable but will enable it to be spread over a longer period without increasing the length of the course. Quite apart from what may be termed structural changes, however, there are others of some moment, as will be seen below; for while the actual subjects in the syllabus remain largely unchanged there is in many places a shifting of emphasis, exemplified in the new clause inserted in the opening paragraph of the syllabuses for medicine, surgery, and obstetrics and gynæcology providing for instruction "in the methods of preventing disease." The additional time allocated to obstetrics is also a sign of the recognition of the need for more practical training in this subject.

The parts of the examination will be: Part I (1) Pathology, (2) Hygiene and Forensic Medicine; Part II (1) Medicine, (2) Applied Pharmacology and Therapeutics; Part III (1) Surgery, (2) Obstetrics and Gynæcology. The examination in Part I can be taken two years and six months after passing the second examination for medical degrees, and that

in the other parts three years after; or all parts can be taken together at this later date.

PART I—PATHOLOGY, HYGIENE AND FORENSIC MEDICINE

(1) *Pathology.*—The compulsory introductory course is now to be in "pathology" instead of in "clinical pathology." The rest of the syllabus is unchanged except that the period of practical work in morbid anatomy, bacteriology, and chemical pathology, formerly specified as six months, is now unstated.

(2) There will still be a combined paper for *Hygiene and Forensic Medicine*, but there will be two oral examinations—one in public health and State medicine and one in forensic medicine and toxicology.

Hygiene.—The transposition in the order of the subjects in the title of this syllabus appears to indicate a deliberate plan to make the student's training more in accord with his future needs. The difference in the hygiene syllabus is so remarkable as to merit detailed quotation.

OLD SYLLABUS	NEW SYLLABUS
A course of instruction in Hygiene, including demonstrations extending over a period of not less than three months.	The course of instruction in Hygiene *should be designed to meet the needs of general medical practitioners*, and include the following:—
The principles of personal hygiene. Cleanliness. Clothing. Ventilation, exercise, sleep, diets.	The relation of the medical profession to the State. National Health Insurance practice.
The principles regulating the sanitary construction of the dwelling. Elementary consideration of sites, soils, ground air, ground water, exclusion of damp, disposal of excreta in town and country, drainage.	Local health authorities, their chief medical powers and duties, their relationship to the general medical practitioner; county and municipal hospital arrangements; public assistance.
Effects of overcrowding, damp, sunlight, dust, injurious occupations.	The organised health services: Maternity and child welfare; care of the school-child; the tuberculosis service; the venereal disease service; the care of mentally defective persons.
Diseases liable to be conveyed by water and food.	Infectious disease—what the health authority can do to help the general medical practitioner and what the practitioner can do to assist in prevention and control.
Ætiology and prevention of the more commonly occurring endemic and epidemic diseases, including isolation and disinfection. The following diseases at least should be dealt with: Measles, whooping-cough, mumps, epidemic diarrhœa, tuberculosis, scarlet-fever, diphtheria, enteric fever, small-pox, chicken-pox, cerebro-spinal fever.	The importance of the general medical practitioner in the collection of vital statistics; explanation of the simpler rates (birth, death, infant, and maternal mortality).
The power and legal obligations of the medical practitioner under public health legislation.	National nutrition; control of milk-supplies; diseases conveyed by food; procedure in outbreaks of food-poisoning.
Elements of vital statistics, including the meaning and interpretation of birth- and death-rates.	Effects of environment on health: Housing, ventilation, water-supplies, defective sanitation.
Causes and prevention of infant mortality.	Effects of occupation on health; duties of examining surgeons under the Factory Act; welfare work in industry.
Correct certification of the causes of death.	

Forensic medicine (and toxicology).—The elaborate syllabus for this subject previously detailed is now replaced by the pregnant sentence that the course "should be designed to meet the needs of general medical practitioners." It may be hoped that this general instruction will be interpreted to include teaching in the difficult problem of assessment of fitness for various kinds of work after injury or illness and of evaluation of compensation and insurance claims.

PART II—MEDICINE, APPLIED PHARMACOLOGY AND THERAPEUTICS

(1) *Medicine.*—The differences here are the insistence on a month's clinical teaching in the children's ward of a recognised hospital; the omission of materia medica and pharmacy from the list of subjects on which questions may be asked; and the addition to this list of physiotherapy, radiology in its application to medicine, and psychology in relation to medicine.

(2) *Applied pharmacology and therapeutics.*—This examination will consist of a paper of three hours and an oral examination on the following syllabus: The rational basis of medical treatment of diseases, the use of drugs, immunological products, hormones, diet, and physical methods, the principles of nursing, dispensing, and the writing of prescriptions.

Though the revised regulations for the first and second examination for medical degrees have not yet been issued, we understand that there will no longer be a separate examination in pharmacology as part of the second M.B., B.S.; that the separate organic chemistry examination which used to be Part I of the second M.B., B.S. will be dropped and that the scope of the examination in physiology will be extended so as to include biochemistry and elementary pharmacology. These changes would be in accordance with the recommendations in the report, issued in April, 1935, of the Medical Curriculum Conference, over which Lord Dawson presided.

PART III—SURGERY, OBSTETRICS AND GYNÆCOLOGY

(1) *Surgery.*—The change in the surgical curriculum is mainly in the addition of radiology in its relation to medicine to the subjects of instruction; the substitution of physiotherapy by mechanotherapeutics among these subjects; and the omission of a specified time (three months under the old regulations) for the duration of courses in ophthalmology and oto-rhino-laryngology.

(2) *Obstetrics and gynæcology.*—The minimum period of study devoted to clinical obstetrics and gynæcology has been extended from five to six months, of which four are to be devoted to obstetrics, including antenatal care and the hygiene of infants, and two (formerly three) are to be spent as clinical clerk in the gynæcological wards and out-patient department. Two of the four "obstetric months" are to be spent in a maternity ward or hospital, preferably in residence. Practical instruction in the principles of ante- and postnatal care, the management of the puerperium, and the care of the new-born infant are to be given throughout the six months.

OTHER CHANGES

In Part I a candidate who fails in one of the subjects ((1) pathology or (2) hygiene and forensic medicine) will only have to take that subject again; but this does not apply to Part II or Part III in which both the subjects making up the part have to be passed at the same time. Candidates will be eligible for honours if they have passed both subjects of Part I on the same occasion and Parts II and III at the next following examination, or if they pass all parts together.

The fee for the whole examination, which will be held, as hitherto, twice a year, in May and November,

has not been fixed, but it will be slightly more than the 12 guineas fee now charged for the two parts. The first examinations in the new Part I of the M.B., B.S. will be held in November, 1938, and in Parts II and III in May, 1939. Candidates will be eligible for examination under either old or new regulations until May, 1940, after which the new regulations will prevail.

RHEUMATIC DISEASES

THE INTERNATIONAL CONGRESS AT BATH

AFTER the congress at Oxford (reported last week), a conference took place at Bath from March 31st to April 3rd. On the first evening the Mayor held a large reception at the pump-room, where Lord Horder gave a presidential address.

The conference had been arranged in connexion with the bicentenary of the Royal Bath Hospital, and Lord HORDER, in speaking of the work of that hospital, mentioned the need for its complete reconstruction in order to maintain its great tradition and prestige. He thought that Bath and other British spas had not yet been used to the full for the relief they offered to rheumatic disease. Although no complete estimates were available of the prevalence of the disease in this country about 400,000 insured workers a year were known to be prevented from following their occupations for the time being by it. The insured workers represented about a quarter of the total population, so the total number of sufferers could be safely taken as over a million. The medical profession should, he thought, combat the idea that British spas could not offer the same healing advantages as continental spas. This might encourage the well-to-do to use the home ones more; the British Medical Association and the British Spas Federation had been considering how the facilities might be extended, possibly by provision of hostels and approved boarding-houses for the poorer class of sufferers.

GOUT AND RHEUMATISM OF METABOLIC ORIGIN

Two of the sessions, over which Prof. F. R. FRASER and Sir HUMPHRY ROLLESTON presided, were devoted to discussions on gout and diseases of metabolic origin.

Sir WALTER LANGDON-BROWN recalled the phase when doctors either thought that uric acid was the cause of most diseases or that it was a by-product of normal metabolism, harmless to the majority of people. The latter view, he said, won the day but left us to wonder why some people undoubtedly suffered from gout. The diminished incidence was partly due to altered habits of living, eating, and drinking. The last time he had seen any considerable number of cases of gout was in 1919 when apparently some people had lost their tolerance for a full diet. But some of the diminution was only apparent, caused by more accurate diagnosis. He thought that a patient could hardly be called gouty if the blood uric acid were less than 3·6 mg. per 100 c.cm. Urinary purines were partly endogenous, partly exogenous, about 0·2 per cent. being excreted by a person on a purine-free diet. The richest source of purines in foods was the nucleoproteins in the more cellular foods. While ordinary meat contained only about 0·06 per cent. of purine nitrogen (beef 0·08 per cent. and chicken slightly more), liver and kidney contained 0·14 per cent. and sweetbreads as much as 0·42. Soft herring roes contained nearly 0·5 per cent. The colour of meat was no index of its purine content.

In evolution the power to synthesise urea had apparently been gained on migration to the land, when excretion of ammonia became impracticable; in the higher animals the amino-purines were broken down to uric acid and most animals could continue the breaking down to urea by means of uricase, an enzyme of the liver. Man, the anthropoid apes, and the Dalmatian hound shared the lack of this enzyme. Sir Walter suggested that some persons suffered from a congenital or acquired difficulty in disposing of their nuclein derivatives, the difficulty being not one of destroying but of eliminating purines, which was possibly due to the loss of power to conjugate them. This led to such an excess of uric acid in the blood that a low-grade arthritis was fanned into intense flame by the deposit of irritating biurate crystals in a structure already involved. The treatment by colchicum remained empirical, its effect being dramatic in an attack but useless to ward it off. Cinchophen averted attacks but its use involved serious risk of toxic jaundice.

Dr. M.-P. WEIL (Paris) reviewed the history of gout, but he maintained that the sharp differentiation between that disease and rheumatism was no longer acceptable. Gouty rheumatism was entitled to the same positions as tuberculous, dysenteric, and ovarian rheumatism. He thought the part played by disturbances in uric acid metabolism had been exaggerated, for even a moderate amount of certain drinks, cold, fatigue, moral indiscretion, traumatism, gymnastics, walking, and sometimes simple intellectual effort were in a predisposed person more disastrous than the absorption of sweetbreads, spinach, or cocoa. Rheumatism might be present for years before its nature was revealed by an attack of gout.

Dr. E. P. POULTON referred to Dr. W. Lloyd's test for predisposition to gout, which relied on measuring the blood uric acid in well-controlled circumstances after a high purine meal. The test had shown that a value of 3·8 mg. per 100 c.cm. was quite normal. Dr. J. FORESTIER (Aix-les-Bains) regretted that diagnosis was difficult, for gout had no typical constant symptom. Sir WILLIAM WILLCOX said that focal sepsis and chronic lead poisoning were important in ætiology; the blood uric acid on the other hand might be high without causing gout, as in the leukæmias. He confirmed Sir Walter's experience that cinchophen was apt to be poisonous, especially in old people; he had more than once known 5 grains given three times daily for a week prove fatal. Dr. C. W. BUCKLEY (Buxton) thought that acute gout might be an allergic manifestation.

Dr. LESLIE HILL (Bath) read the paper published elsewhere in this issue. Dr. HUBERT GIBSON gave a communication with Dr. G. D. KERSLEY, in which they concluded that no test or group of tests had yet been found which gave positive diagnostic information on borderline cases of gout. These merged into other forms of chronic rheumatism. A high blood uric acid after a standard high purine diet might be suggestive of gout; the response to ephedrine and Bellafoline was not in striking contrast to the effect of ergotamine tartrate and pilocarpine (to produce vagotonia). So-called gouty teeth had proved indistinguishable from those from non-gouty people; the X ray changes—the well-defined punched-out areas, the less definite small areas under cartilage, and the periostitis—could all be found in cases of rheumatoid arthritis. Radiograms of the hands closely resembling gout had been seen especially in rheumatoid arthritis complicated by chest infections, probably tuberculous

in origin, but the interrelationship was difficult to determine.

Dr. NAJIB-FARAH (Alexandria) related the decline in gout with the increased prevalence of sport. Dr. F. COSTE (Paris) thought the manifestations of gout might vary from country to country. Mr. JOSEPH RACE, D.Sc. (Buxton) mentioned the inheritance of gout and the disease's geographical distribution as evidence of its distinct character. Dr. D. COLLINS said that from the point of view of morbid anatomy the events preceding the deposits were of greatest interest; there was an acute inflammatory reaction, accompanied in joints sometimes by a polymorphonuclear exudate. Dr. ANDRONESCU (Rumania) thought that inadequate respiration played its part in maintaining gout. Dr. GUNNAR KAHLMETER (Sweden) said that in his country gout was not common and he had seldom been able to obtain a family history of it. Dr. J. VAN BREEMEN (Amsterdam) thought the history of mankind would have been very different without gout, for many famous people had been sufferers—Wallenstein, Linnaeus, Vesalius, and Goethe being among them. Dr. ERNST FREUND (Vienna), whose paper was read in his absence, thought that neither diabetes nor obesity were related to gout, except that the latter might be evidence of over-feeding. The incidence of nephrolithiasis in gouty persons was however definitely high. Dr. C. H. G. PRICE (Bristol) reported five cases of heart failure which when treated with Salyrgan had developed gout at the time of maximum diuresis. Dr. FORESTIER (Aix-les-Bains) had noted a history of indulgence in alcohol in a large number of his cases. Dr. PHILIP HENCH (Mayo Clinic) thought that well-marked gout had usually been earned rather than inherited. The criteria he would uphold were the character of the attack and the response to treatment; high uric acid values and tophi were signs, not the cause, of a gouty attack. He thought irregular gout would be better called questionable gout.

Dr. R.-J. WEISSENBACH and Dr. F. FRANÇON described the radiographic appearances in some cases of classical gout.

JAUNDICE AND RHEUMATOID ARTHRITIS

At the third session of the conference, with Sir WALTER LANGDON-BROWN in the chair, Dr. HENCH spoke of the effect of spontaneous jaundice on rheumatoid arthritis. He said that jaundice involved a physiological reaction which was antagonistic to the continuation of active symptoms of rheumatoid arthritis and primary fibrositis. With the onset of any one of several types of jaundice, rather dramatic remissions in rheumatic symptoms, lasting 3–104 weeks, occurred in nineteen cases of rheumatoid arthritis, in nine of primary intramuscular or periarticular fibrositis, in two of lumbosacral and sciatic pain, and in one of secondary hypertrophic arthritis of the hips. Remissions averaged roughly from two to three times the average duration of the jaundice and affected symptoms of active disease; residual articular thickening and disability from deformity were however unaffected. The phenomenon depended more on the quantity than on the quality of the jaundice, a certain intensity of jaundice being required. Intercurrent jaundice of varying types and severity had not alleviated symptoms of certain other painful articular and neuritic diseases and so the phenomenon might be relatively specific for rheumatoid arthritis and fibrositis. Dr. Hench thought the phenomenon might have application in other conditions. The responsible agent and its mechanism had not been identified; bilirubin, bile salts, hepatic autolysate, and low diet (as in jaundice) had all been considered. It had been suggested that the patients were too ill to notice their joints, had been improved by rest, or had been dehydrated. In reality the patients had been more active. Several methods had been used to induce jaundice which had to be fairly severe. A method worked out by Thompson and Wyatt of administering bile salts intravenously had so far proved the best, but had not brought about the relief given by spontaneous jaundice. Regardless of the supposed validity of the infectious theory, rheumatoid arthritis and fibrositis could obviously be profoundly influenced by an occurrence primarily chemical. Though the pathological changes might be permanent their pathological physiology was more rapidly reversible than had been supposed.

After a brief discussion of Dr. Hench's paper Prof. STANLEY DAVIDSON (Aberdeen) put forward a motion for debate, arguing that the incidence of rheumatic disease in this country and in Scotland was so great that the full accommodation for treatment, diagnosis, and research could not be within the scope of the voluntary hospitals.

Prof. RALPH PEMBERTON (Philadelphia) discussed vascular changes in relation to arthritis.

The social round at the conference was full. Two dances at the pump-room with a glimpse through the window of the steaming spring floodlit with two colours, a civic banquet, two cocktail parties (given simultaneously in five or six houses), a demonstration of spa methods and of cases, and several excursions were all part of this strenuous conference.

MEDICINE AND THE LAW

Doctor of Science but not of Medicine

A LIBEL action sometimes invites decision of an issue which is more than personal. In Mellor *v.* Medical Defence Union, for instance, there arose the general question of the propriety of using the title "doctor" in circumstances where it might be misleading. Miss Ethel Mellor is a distinguished doctor of science. She was the first British woman to obtain this degree at the University of Paris. She is also an Associate of the Royal College of Science (of botany) in London, and—a qualification which perhaps she will forgive us for mentioning last—a doctor of osteopathy of a college in America. She "practises the healing art," to use a phrase frequently heard during the trial, but she is not a registered medical practitioner. Her door plate in Welbeck-street bears only her name with the prefix "Miss." Her professional cards give this ampler description: "Dr. Ethel Mellor, A.R.C.S., D.Sc., D.O., Osteopathic Practitioner, 13, Welbeck Street, London, W.1." As the initiated are aware, there is not the slightest reason why an unregistered practitioner should not practise the healing art. Parliament, however, has deliberately created a Medical Register on which the names of duly qualified practitioners are placed. The reason for this step, as the Medical Act expressly states, is the expediency of enabling the public to distinguish between qualified and unqualified practitioners. Section 40 of the Act makes it an offence to do various things which obscure that distinction. Inter alia the unregistered practitioner is forbidden by Section 40 to use "wilfully and falsely" the name or title of "Doctor of Medicine" or any name, title, or description implying that he is registered under the

Act. In this connexion the Medical Defence Union invited Miss Mellor, "in view of the recent decision which was secured at Brighton in the Deacon case," to undertake not to use the description "Dr." in front of her name, since the Brighton decision had held this to be an infringement of Section 40 and since the description could be confusing and misleading to the public.[1]

Miss Mellor, however, carried the war into the enemy's camp by issuing a writ for libel. By this letter, and by others which followed, she claimed that she was defamed. The letters meant that she had no right to her title of "Dr.," and was unlawfully, falsely, and wilfully using it, implying that she was a doctor of medicine or a registered medical practitioner, that she was dishonourable, had no learning, qualifications, experience, or credentials, and that she was actuated by base motives and used the title of "Dr." for fraudulent purposes. Though she conducted her own case, she showed great technical skill in the framing of this innuendo. The defendant union countered with the usual defences, denying that it published the letters, denying the innuendo, and pleading that the words complained of were privileged and were incapable of any defamatory meaning. When the plaintiff had completed her case, the Lord Chief Justice accepted the submission, made on behalf of the Medical Defence Union, that there was no case to go to the jury. The words complained of, he said, were not reasonably capable of a defamatory meaning. Even if the words had been defamatory, they were, on Miss Mellor's own admission, published on a privileged occasion, and there was no evidence of malice on the part of the defendants. Judgment was therefore given for the defendants with costs.

Miss Mellor had put her case with all possible force. She admitted that she was not, and never had been, on the Medical Register and that she held no qualification for admission to the register. In effect she claimed that she had fairly won the title of "Dr." and that the Medical Act could not deprive her of it. There are, of course, many kinds of doctorate. The question is whether the public, accustomed to address as "doctor" everyone who practises the healing art, will appreciate that the prefix "Dr.," if used by a practitioner professionally, is not meant to imply a doctorate of medicine. Logically, one feels, Mr. Jones, a doctor of music, or Mr. Smith, a doctor of law, might put up their plates in Harley-street, if they decided to take up the practice of the healing art, with the description "Dr. Jones, Mus. Doc." or "Dr. Smith, D.C.L." On Miss Mellor's contention they would be outside the reach of Section 40. There would naturally be the usual duty upon the prosecution to satisfy a court that the law had been infringed and that the public would be misled. The locality in which the descriptions were displayed might be some evidence in itself. Miss Mellor not unreasonably claimed that, *quâ* doctor of science, she had a title not to be obtained without a wide knowledge of the healing art. To that extent her case might be much stronger than the case of Mr. Jones and Mr. Smith. On the other hand the closer a doctorate of science is to a doctorate of medicine, the greater the need perhaps to avoid confusion. From Miss Mellor's point of view the strength of her position was that she could say "I am a doctor; therefore I can use the title of doctor." This contention is not far removed from Captain Barrow's argument in Jutson *v.* Barrow (1936) when in effect he said "I am a manipulative surgeon and I challenge the Medical Defence Union to prove that I am not." A closer parallel is Ellis *v.* Kelly (1860), where the defendant, possessing the degree awarded by a Bavarian university, called himself simply "Dr. Kelly" and the justices thought that he was entitled to do so on the supposition that he held the degree. The prosecution of Kelly is something of a mystery for reasons given by Mr. Justice Humphreys in Jutson *v.* Barrow; but it is noteworthy that Baron Bramwell, who delivered a judgment favourable to Kelly, afterwards in Andrews *v.* Styrap indicated some change of mind. The Andrews case was one where the plaintiff had not the justification of possessing a degree. The one thing certain in Mellor *v.* Medical Defence Union is that Miss Mellor possessed an important degree and had no intention to confuse the public. But, as was patiently explained by Lord Hewart in Jutson *v.* Barrow, the words "implying that he is registered" in Section 40 are words not purporting to describe the intention of the individual but are words describing the effect of the title on the public. If the appellation "Dr." carries with it the implication referred to in Section 40, the intention of the individual is immaterial. The section was passed to protect the public; the question is what meaning the appellation will convey to the public.

[1] See *Lancet*, 1936, **1**, 683.

A Year's Crime

The annual Criminal Statistics for England and Wales (Cmd. 5690. H.M. Stationery Office. (3*s.* 6*d.*) deal with the year 1936. In less than 1 per cent. of the total of all offences is the charge serious enough to go before a jury. More than half the offences are traffic offences. Real crime—that is to say indictable offences, mostly thefts—account for only 9 per cent. The remainder includes such matters as breaches of by-laws, failure to take out dog licences, Sunday trading and betting offences, and infractions of the laws regarding intoxicating liquor. Juvenile crime is still rising. Among offenders under 17 charged with indictable offences the figure per 100,000 of population has climbed from 481 in 1934 to 597 in 1936; over 17 the rate is falling. There are more larcenies in 1936, more sexual offences, and more cases of violence against the person. Murder remains at its characteristically stable figure. In 1936 there were 99 cases of murder known to the police. In 33 of them (involving 41 victims) the murderer or suspect committed suicide; in respect of 61 cases 64 persons were arrested; in 5 cases no arrest was made. What happened to the 64? Ten were found "not guilty"; 23 were convicted and 8 of these were executed. Once more the mental state of the accused gives the community serious occasion for thought. Twenty of the 64 either were acquitted or were accounted for by death before trial, discharge at the police-court, or arrest and disposal abroad. Of the remaining 44 no fewer than 28 are officially shown to have been affected by various degrees of insanity. Eleven were found insane when called upon to plead; 15 were found, in the law's ridiculous formula, "guilty but insane"; two, after being sentenced to death, were certified insane and removed to Broadmoor. It is disquieting to find how many lives are sacrificed through the uncontrolled liberty of the mentally unstable or, to put it in another way, our failure to diagnose and treat mental instability.

SUICIDE

The statistics of suicide are remarkable and interesting. The number of verdicts of suicide in 1936 was 5007 as compared with 3474 in 1911; the correspond-

ing figures of attempted suicides known to the police are respectively 3080 and 2313. The curious thing is that among men under 55 the suicide rate is lower in 1936 than in 1911, while over 55 it is a little higher, whereas among women over 45 there is a notable increase. The female figures per million of population show that in the age-group 15 to 20 the suicides were 38 in 1911 compared with 18 in 1936, whereas in the three age-groups 45 to 55, 55 to 65, and 65 and over, the 1911 figures are 109, 112, and 79 against the 1936 figures of 163, 161, and 113. What explanation have our social workers to offer?

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A CONSULTING PHYSICIAN

II

"Age and crabbèd youth cannot live together."

THUS H. W. Nevinson inverted Shakespeare's line after reading The Voice of Under Thirty in the *Spectator* lately. Many readers were distressed at the indecision and despair most of these youthful writers betrayed. But this is really nothing new. I remember that before the war the sea-green incorruptible *Westminster Gazette* published a series of articles entitled "Si jeunesse savait," much to the same effect. I have cheered many a gloomy adolescent by referring him to the preface of Keats's "Endymion," wherein he says that between boyhood and maturity "there is a space of life in which the soul is in a ferment, the character undecided, the way of life uncertain, the ambition thick-sighted; thence proceeds mawkishness and . . . [a] thousand bitters." It is reassuring for such a one to find that Keats, who accomplished so much, felt as he does now.

No doubt such feelings often find expression in a form which we seniors find distinctly unpleasing, but if we look back at our own youth we must in candour admit that our seniors must often have found us disagreeable while we were trying to assert our individuality. And we must remember that we grew up in a world which seemed relatively sane and stable. One great difference I do notice, however. In my time every college was honeycombed with little discussion societies where, aided by coffee and "whales on toast," we criticised a paper read by one of our number. To-day few such societies seem to exist—"if we have some time off we go to the cinema" one undergraduate told me—and such societies as do exist prefer to get a senior man to read the paper. Student medical societies too often do the same. What a valuable training they are missing. I always look back with pleasure to those "Noctes Ambrosianæ" when having

"tired the Sun with talking and sent him down the sky"

we put the world to rights. This education of one another by ourselves was surely one of the most valuable things in university life. Yet a young Oxford novelist, David Winser, makes a character say "With no one have I sat in front of the fire and talked into the small hours. And my uncles used to. Almost every night. No one at all except a Groupist. And even then it wasn't me who was talking." I can hardly credit, however, that undergraduates have ceased to talk! R. L. Stevenson said that it happened he had the very last of the very best of his old university which was the more strange as the same thing befell his father before him, and if he had a son doubtless it would also be his fate. This frame of mind exists because being at the university is like falling in love; no one can ever have had such an experience before, nor is it credible that anyone else can have it in the future. At a rational level, however, one knows that in many ways things have greatly improved there, but one doubts if the student can now lead so care-free an existence.

* * *

We seem to be reproducing the aftermath of the Renaissance. Of that great movement of the mind of man the late Sir Walter Raleigh wrote "from his servant's estate in the great polity [of Catholic theology] man was released and became his own master in chaos, free to design and inhabit for himself." Men believed that they could reap where they had not sown. Something similar is happening to-day; many theological dogmas have been set aside and again man felt himself set free from external bonds only to find he was not free from himself. In both instances there had been a phase of rapid expansion both in thought and in wealth followed by disillusionment on the intellectual side and greater stringency on the financial. On each occasion old standards were destroyed before adequate new ones could be provided in their place. On each occasion the world experienced the shrewd winds of disillusionment. The sword is not being beaten into a ploughshare; rather do hangars arise where once corn grew.

The effect of this on the younger generation is sometimes quite serious. C. P. Snow in his novel, "The Search," describes this effect upon the lives of a group of research workers. He makes one of them say "Your father and mother hadn't the certainty more or less that civilisation is going to crash in their lifetime. We have. . . . For you and me, for almost everyone life is fuller and richer than it has ever been. With one qualification. There is no hope. . . . Simple freedoms, but very precious . . . my sort of man has only had for an infinitesimally short time. They'll have gone from all over Europe except France and England and Scandinavia in ten years. From England in twenty. And for a very long time they will not come again."

* * *

We may think this picture is too black; the important thing is that it represents a not uncommon point of view and it is one which must tend to paralyse endeavour. Yet it should be remembered that there was an equally profound disillusionment produced by the events following the French Revolution. Edmund Burke said "the glory of Europe is extinguished for ever." Things looked black for Europe then as they do now, but the skies brightened again, as they may do yet. Science on the one hand offers material comfort, on the other, intellectual abstractions. This leads to a mechanised world without moral direction, with science as the handmaid of destruction. Fortunately we are not faced with the dilemma which must confront many a worker in the physical sciences—is he to go on with his researches without any reference to the probable ethical consequences? Of all the branches of biology,

medicine can take the largest share in the reconciliation of science with ethics. That is why medical men feel that with all its drawbacks, it is a subject to which they can devote their lives with pleasure and satisfaction. William James said "the great use of life is to spend it for something that outlasts it." That profound satisfaction is ours. And I shall give myself the pleasure of quoting him again in sentences which have always sounded in my ears like a trumpet call. "For my own part I do not know what the sweat and blood and tragedy of this life mean if they mean anything short of this. If this life be not a real fight, in which something is eternally gained for the universe by success, it is no better than a game of private theatricals, from which one may withdraw at will. But it *feels* like a real fight—as if there were something really wild in the universe which we, with all our idealities and faithfulnesses, are needed to redeem; and first of all to redeem our own hearts from atheisms and fears. . . . Be not afraid of life. Believe that life is worth living, and your belief will help create the fact."

PUBLIC HEALTH

The Caravan Menace

CARAVAN encampments often cause local authorities anxiety not only because of the difficulty of getting rid of them but because of the menace to public health. Caravans are dumped on sites for use during the summer season and there they remain. An action at the Sussex Assizes at Lewes on March 30th resulted in the judge finding that the action of the Battle rural district council in removing a caravan at Winchelsea was justified under its powers under Section 27 of the Public Health Act, 1907, and judgment was given in its favour. The owner of an abandoned caravan claimed damages for alleged trespass in respect of its removal. He and other members of the Caravan Association relied, and said they were protected, by a decision of Mr. Justice Atkinson. They said if the caravans must not be inhabited they would get out and would promise not to inhabit them again, and would put them up for sale. It transpired during the hearing of the case that there had been a case of typhoid fever on the encampment. It was found to be a contact case from outside, but it might have led to a serious epidemic. This fact, no doubt, weighed with the council in deciding to exercise its powers, and the result has justified the principle involved. Having established its principle, Mr. Justice Greaves-Lord said, in giving judgment, the case was one which must have an effect on local opinion which could not be disregarded.

Section 27 of the 1907 Act has been replaced by Section 53 of the new Public Health Act. The drafting committee which produced the consolidation Bill said that the usual instance dealt with under Section 27 was the private garage. The section was concerned with buildings constructed of short-lived materials. For the present provisions about "tents, vans and sheds" reference must be made to Part XI of the 1936 Act. Here Section 268 (reproducing Section 9 of the Housing of the Working Classes Act, 1885, as extended by Sections 43 and 50 of the Public Health Act, 1925) enables any tent, van, shed, or similar structure used for human habitation to be dealt with as a statutory nuisance if it is either overcrowded to the prejudice of the inmates' health or so used that, by reason of the absence of proper sanitary accommodation or otherwise, it gives rise to a nuisance or to conditions prejudicial to health. Section 269, which controls the use of movable dwellings, follows precedents in local Acts. Here the main Parliamentary discussion arose over the propriety of applying it to all rural district councils, one of which (Easington) had already obtained it by local Act. The Parliamentary committee which examined the proposal was told that there were two types—one the semi-permanent encampment which becomes almost a slum, often occupied by gipsies and similar inhabitants, the other the seasonal holiday-makers' encampment where visitors come in relays all through the summer with results which are sometimes unsatisfactory. This section has a special subclause whereby the Minister can exempt a camping association which undertakes to control its members and to see that their camp-sites are properly managed and kept in good sanitary condition. The law as a whole does not press hardly upon the reasonably well-behaved camper. Indeed the Physical Training and Recreation Act of last year encourages local authorities to acquire and equip holiday camps and camping sites and even to engage and train wardens and leaders to secure that effective use is made of such facilities.

Red Cross Clinic for Rheumatism

The clinic in Peto-place which was opened by the British Red Cross Society eight years ago is finding that demands have outstripped its accommodation. During 1937 the treatments given in the general department amounted to 134,000, in the private patients' department to over 11,000, and increasing use was made of the various specialist departments. The medical board report that the lack of in-patient facilities is proving a handicap in the treatment of the more advanced cases; little provision has so far been made for such patients in general hospitals. Many patients, especially those with early manifestations of rheumatoid arthritis, would be greatly benefited by a protracted period of convalescence but there is still no place to which they can be sent. The evening sessions intended to allow patients with early rheumatism to attend for treatment without missing their work have been well attended and there are signs that the importance of early treatment is becoming increasingly appreciated. It is difficult to assess results at the clinic, depending as they do largely on such factors as the stage of the disease when the patient comes for treatment, his occupation, economic status, domestic conditions, and general health; but of the 700 men and 1100 women who completed their course of treatment in 1937, 36 per cent. were free from subjective symptoms, 49 per cent. were definitely improved, 14 per cent. were unchanged, and only 1 per cent. were worse.

The New Zealand Medical Service Scheme

We noted recently[1] the anxiety of the medical profession in New Zealand at the promotion by the Government party of a scheme of medical service which would virtually abolish private practice. The scheme has now taken definite form. The New Zealand government, according to a recent broadcast by the Prime Minister, Mr. Savage, is proposing to introduce a national insurance scheme for all which will include the services of a doctor, hospital, sanatorium, mental hospital, and maternity treatment, and later, if practicable, the provision of

[1] *Lancet*, Feb. 19th, p. 447.

specialists, dentists, opticians, and home nurses. Everyone over 60 will be entitled to a pension of 30*s.* a week and there will be pensions of the same amount for invalids, of 25*s.* a week for widows, and 15*s.* a week for orphans. The scheme will be financed by converting the present unemployment tax of 8*d.* in the pound on all incomes into a "social security contribution" of 1*s.* in the pound, and adding pound for pound to the fund from the general revenue. According to the *Times* the cost is likely to be £16,000,000 a year.

Identification Card for Diabetics

The New York Diabetes Association has prepared[1] an identification card to be carried by diabetics taking insulin. The card is 2½ in. by 4 in. and on one side bears the following text:

Notice.—In case of emergency. The bearer of this card has diabetes and is using insulin. In case of sudden faintness or unconsciousness give 2 tablespoons of sugar dissolved in a glass of water, and call a doctor.

On the reverse is space for the name and address and telephone number of the holder and his doctor, and there follows a certificate to be signed by the doctor stating that the patient is legally entitled to own and use a hypodermic syringe for the administration of insulin. There would seem to be room for the extension of this scheme to those liable to such things as recurrent syncope, epilepsy, Stokes-Adams disease, and even perhaps alcoholic coma. Unfortunately there would be no guarantee that the diagnosis given on the card was the correct one.

[1] *Quart. Bull. N.Y. Cit. Dep. Hlth*, 1937, **5**, 10.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 26TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 2 (Gravesend 1, Port of London 1); scarlet fever, 2167; diphtheria, 1404; enteric fever, 13 (22 "expected"); pneumonia (primary or influenzal), 1254; puerperal pyrexia, 191; cerebro-spinal fever, 43; acute poliomyelitis, 3; acute polio-encephalitis, 1; encephalitis lethargica, 3; relapsing fever, 1 (Whitley U.D., Northumberland); dysentery, 92; ophthalmia neonatorum, 93. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on April 1st was 5693, which included: Scarlet fever, 838; diphtheria, 1128 (carriers 48); measles, 2339; whooping-cough, 307; puerperal fever, 17 mothers (plus 10 babies); encephalitis lethargica, 282; poliomyelitis, 1. At St. Margaret's Hospital there were 14 babies (plus 25 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 67 (23) from measles, 6 (3) from scarlet fever, 13 (1) from whooping-cough, 27 (8) from diphtheria, 47 (18) from diarrhœa and enteritis under two years, and 78 (9) from influenza. The figures in parentheses are those for London itself.

Coventry reported the only death from typhoid. Measles was fatal in 25 great towns; Liverpool reported 5 deaths, Newcastle-on-Tyne 4, Manchester and Plymouth each 3. Diphtheria was fatal in 16 great towns, Manchester reporting 3 deaths. Eight fatal cases of influenza were reported from Birmingham, 5 from Bristol.

The number of stillbirths notified during the week was 283 (corresponding to a rate of 40 per 1000 total births), including 31 in London.

OBITUARY

THOMAS ALEXANDER McCULLAGH, M.R.C.S., J.P., D.L.

Dr. McCullagh had long been an outstanding figure in South Durham and his death at the age of 85 closes a life of wide interests and sympathies. He was the son of Thomas McCullagh, a distinguished Wesleyan divine, and was sent to Guy's Hospital to study medicine. In 1876 he became M.R.C.S. Eng., and two years later he took the licence of the Edinburgh College of Physicians. Meanwhile, after working for a short time in Liverpool, he had gone to Bishop Auckland as junior partner to Dr. John Jobson. This was in 1877 and he remained in the same practice until 1923, since when it has been carried on by his son. He will be remembered as a fine example of the old school of country doctors. He was both a reader and a sportsman, keen on riding, hunting, shooting, racing, and golf; courteous, gentle, and erudite, he yet had pursuits that enabled him to meet on their own ground any of the many types of patient encountered in the large area of his practice. "His was a great presence in the sick room," writes a colleague, "and his reputation extended far beyond the area in which he worked. His practice included attendance on many county families in the more prosperous days of Durham county, and he was thus brought into contact with many distinguished figures in various walks of life—political, social, artistic—of whom he had many reminiscences." As soon as he went to Bishop Auckland he joined the Volunteers as regimental surgeon, and when the Volunteers were merged with the Territorials he continued his service with rank as lieut.-colonel, receiving both the Volunteer and Territorial long service decorations. One of the oldest members of the Bishop Auckland bench, he was medical officer of health for the town until last year, and was a deputy-lieutenant for the county.

The Bishop of Durham, Dr. Hensley Henson, who became Dr. McCullagh's friend and frequent companion, writes of his conversation on books, birds, and politics, and of his omnivorous but discriminating tastes as a reader. "More than most men whom I have known," he says, "he combined the urbane manner and tolerant habit of a man of the world with the genuine piety and religious habit of a true Christian. He was, indeed, both. His long acquaintance with 'all sorts and conditions of men' had made him take an indulgent view of normal humanity, but it had deepened his belief in Christianity as the deepest truth for man. . . . Bishop Auckland was proud of the stately old man, whose presence added dignity to the rather drab aspect of the town. His absence will be felt and lamented."

Dr. McCullagh married in 1878, and his wife, the eldest daughter of Richard Bowser, died only a few months ago. There were four children—Commander A. B. McCullagh, R.N., who died in 1936, Colonel H. R. McCullagh, D.S.O., Dr. Cecil McCullagh, D.S.O., and a daughter, Mrs. Favell.

THE LATE MR. A. W. CUFF

Prof. MILES PHILLIPS writes: "Many of Archibald Cuff's friends would like some record of his personal attributes to be added to the account you have already given of his professional career. Children loved him dearly, treating him rather as one of themselves; they looked forward to parties when he would conjure for them with a skill that few amateurs possess. His great pleasure was painting; as a boy he painted his dogs, and he started again with small water-

colour sketches one summer holiday in Cornwall, and for years after his happiest hours were spent in a cornfield or other country spot. Collecting old china was his chief hobby, and experts were often glad to have his opinion about some piece they were not sure of.

"His patients trusted and loved him; he would pay them 'unprofessional' friendly visits, and cheer them by talk on general topics. He was sympathetic and yet would not allow them to make too much of pain. We only knew how well he practised what he preached when he became ill himself. In spite of losing the use of his right hand, and so being cut off from painting, and being word-blind and so unable to read, he was unfailingly plucky. What pleased him most in those sad years was to be asked advice about some difficulty—a personal anxiety to be solved, or just the right word to be found for a paper that had to be written. Strangely enough, although he could not read he was particularly good at finding the right word, and it gave him pleasure and pride to be able to do it."

THE LATE DR. THOMAS ROSE

Dr. A. Knyvett Gordon writes: "May I add to your obituary notice of Dr. Thomas Rose by mentioning a side of his activity which was perhaps not generally known. I refer to his great skill and experience as a morbid anatomist. As a pathologist to many coroners, his work was very good indeed. His post-mortems always reminded me of an expert surgical operation. He was one of the best dissectors I ever knew, and his subsequent evidence in court was a model of lucidity. His experience was great, and a text-book from his pen would have been a valuable contribution to the literature of morbid anatomy. Unfortunately none of his intimate friends could ever persuade him to publish anything.

CORRESPONDENCE

NUTRITION AND DISEASE IN DENMARK

To the Editor of THE LANCET

SIR,—In an article which appeared in THE LANCET of Feb. 5th Dr. Johanne Christiansen comes to the conclusion that "Hindhede's theory that the excellent health of the Danes during 1918 was due to a sparse and largely vegetarian diet enforced by war rationing is not justified by the facts." It is, I agree, good for the Danish farmer that Englishmen should believe in our eggs and bacon, but Dr. Christiansen has, to my mind, misled your readers about nutrition in Denmark during the late war. Although she has succeeded in persuading the Danish Department of Statistics to make a calculation showing that the consumption of meat in 1918 was greater than the normal, the truth remains that it was in fact far lower.

The discrepancy is to be explained thus: the Department bases its calculations on the number of domestic animals, reckoning with a normal slaughtering of beasts of normal weight. Actually, the cattle were starving for lack of food and were often mostly skin and bone. Moreover, the farmers secretly slaughtered many small pigs for their own use. While this, of course, was illegal, the local authorities were unwilling to report their friends to the police. Consequently the farmers had enough bacon while very little was available for other people. Bacon was in fact rationed—120 grammes weekly for each person—and even this amount often could not be had. No more than 200 g. of beef was available at the normal price. If more was wanted, thrice the price had to be given. "Meat is so expensive," wrote a leading Copenhagen paper, "that common people cannot afford to eat it, even on Sundays." As this shortage of meat was on the verge of inducing revolt among labourers, the president of the Council for Nutrition reported to the Unemployment Committee that it was not possible to procure more than a third of the normal consumption of meat at the ordinary price.

Your readers may not find it easy to decide whom to believe; and I venture to remind them that my experiments on a cheap plain Chittenden-like diet were started forty years ago and aroused so much interest that the Government granted me a laboratory for nutrition. When the blockade threatened us in 1917 with starvation, I was appointed counsellor of the Government and issued a pamphlet advising the public to live on a diet consisting mainly of wholemeal rye bread mixed with wheat-bran, potatoes, barley porridge, milk, a little butter, and very little meat and vegetables. Of this pamphlet 40,000 copies were distributed and in 1918 I spent half my time travelling round the country giving instruction. In the discussions which followed my lectures I often heard housewives say: "That is all very well, but here we all live in accordance with your principles. We are compelled to do so." On these journeys I had ample opportunity to observe the underfeeding of cattle and its consequences. If anyone at that time had said that people were eating more meat than usual, the statement would have raised a laugh.

My own feelings on the low-protein diet are for me the best proof of its value. After living for forty years on this diet I do not feel old at 76. Last summer I travelled on cycle from one end of the country to the other, about 80 miles a day.

I am, Sir, yours faithfully,

Copenhagen, April 2nd. M. HINDHEDE.

HEARING-AIDS FOR DEAFNESS

To the Editor of THE LANCET

SIR,—I have read with great interest Dr. Dalton's letter in your issue of March 26th. It is always of real value to have the practical experience of a doctor describing the symptomatology and treatment of his own malady—and I most heartily agree with the advice he gives that no aurist should permit his patients to purchase a hearing-aid until the patient has fully tested it.

I would however go very much further than this and say that no patient should ever be sent to a vendor of hearing-aids unless an exact record of his hearing has first been obtained. The present state is chaotic. It is comparable with an ophthalmologist who refers a patient to an optician for glasses without making the slightest attempt to test the patient's refraction. Such procedure subjects the patient to the possibility of exploitation and is strongly to be deprecated. Though the time has not yet come, despite all that one reads, when a hearing-aid can be prescribed with the same accuracy as a pair of glasses, this does not excuse the aurist from making an exact calculation of the hearing loss both by air and bone conduction throughout the auditory range of from 200 to 10,000 vibrations. This result

can only be expressed in a constant unit, and the yardstick of hearing is the decibel.

The aurist who fails to make use of the decibel measurement is like a fisherman describing with his hands the size of the fish that got away. The result of the examination of the patient's hearing should be charted in decibels, when it is possible by a glance at the graph to tell with scientific exactitude the type of aid best suited to the patient. Such a chart can tell you whether a carbon or crystal microphone will give the better definition and whether air or bone conduction should be used.

I am, Sir, yours faithfully,

EDWARD CAREW-SHAW.

Harley-street, W., March 29th.

ONCHOCERCIASIS

To the Editor of THE LANCET

SIR,—Reporting in your issue of March 5th on a case of onchocerciasis showing ocular complications diagnosed in this country, Dr. Adams refers to the possibility of the occurrence of similar cases in Europe. As a matter of fact, during the last six years such cases have been recorded in Germany, France, and Belgium, and now that attention has been focused on the matter it is very probable that in the future further cases will come to light.

Unfortunately treatment is far from satisfactory. The surgical removal or destruction of parent worms frequently fails to achieve its object, microfilariæ persisting, perhaps because of the presence of other adults, while the ocular damage remains unarrested; chemical attempts to destroy the worms or their embryos are also unsatisfactory, as we do not possess an efficient filaricidal drug.

Now opinions differ as to how much of the ocular damage is due to the mere mechanical presence of embryos in the eye, and how much is due to something in the nature of an allergic reaction associated with the presence of filarial products. As the results of orthodox treatment are uncertain and blindness is a serious condition, it seems, in view of the possibility of an allergic factor, worth considering whether the ordinary methods of treatment may not be supplemented with attempts at desensitisation by means of graduated doses of filarial antigen. This process, which was introduced by Dr. Fairley and is now being tested by us in the treatment of other filarial manifestations at the Hospital for Tropical Diseases, London, appears to be of considerable value. In the case of ocular onchocerciasis it would of course be necessary to proceed with the utmost caution lest any focal reaction precipitate the very condition it is wished to circumvent.

I am, Sir, yours faithfully,

Harley-street, W., April 5th. F. MURGATROYD.

"OUR COLLEAGUES IN AUSTRIA"

To the Editor of THE LANCET

SIR,—May I express my entire agreement with Mr. Aubrey Goodwin's letter in your last issue? A further accession to the British medical profession of medical refugees from Central Europe will have very serious consequences for practices here, and will undoubtedly result in undue competition. This being the case I am convinced that the bulk of the profession does not agree with the signatories of the letter under the heading "Our Colleagues in Austria" in your issue of March 26th. I suggest that a vote be taken of the whole medical profession in the British Isles on this question by some authoritative body.

I am, Sir, yours faithfully,

FREDERICK C. ENDEAN.

Queen Anne-street, W., April 2nd.

To the Editor of THE LANCET

SIR,—Jewish members of the medical profession must surely have been touched by the friendly and generous terms of the letter which was recently published in your columns over the signatures of many distinguished men, dealing with the tragic plight of our colleagues in Austria. Mr. Aubrey Goodwin's comments, however, show very clearly the difficulties that have to be overcome before goodwill can be converted into constructive help. Clearly no one has in mind admitting a large number of foreign doctors into this country, and I doubt, equally, whether anyone would advocate their complete and absolute exclusion without any regard to the merits of the individual case. The procedure which has been followed in the past may perhaps guide us in deciding on a fair and reasonable policy for the future.

Since March, 1933, a total of 187 German doctors have been permitted to settle and follow their profession in this country. To see the meaning of this concession in a balanced way one must bear in mind that there are over 50,000 names on the Medical Register. For the last few years the Home Office has only granted permits in exceptional circumstances when it was conclusively shown that the applicant's special knowledge and experience would be of benefit to the profession as a whole. May I venture to suggest that it would be reasonable to continue such a policy, because it provides full safeguards for the interests of the profession, while offering the possibility of permitting certain carefully chosen individuals to continue their work here to the advantage of medical science and for the relief of human suffering.

I am, Sir, yours faithfully,

SAMSON WRIGHT.

Golders Green-road, N.W., April 5th.

To the Editor of THE LANCET

SIR,—As there are probably many of your readers who would like to add their signatures to the letter on doctors in Austria which you published in your issue of March 26th, would you be good enough to insert the following notice?

Will any members of the medical profession who are in sympathy with and would like to sign the letter published on March 26th on the subject of refugees in Austria please send their names to the hon. secretary, Medical Peace Campaign, 39, Southgrove, London, N.6.

I am, Sir, yours faithfully,

April 3rd. MARY T. DAY.

TASMANIA AND IMMIGRANT DOCTORS.—The Tasmanian Parliament has passed a Bill amending the Medical Act in view of a possible influx of doctors from Germany. Fourteen applications from German medical men have so far been made. The amending Bill requires candidates for registration to be British subjects and to possess a qualification obtained after "a complete course of training and examination in the country where the qualification was issued, at a university, college, or other institution recognised for that purpose in that country," or/and to possess "such other qualification as may be prescribed."

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Housing in Scotland

In the House of Commons on March 29th Mr. WEDDERBURN, Under-Secretary of State for Scotland, moved that the draft of the Housing (Scotland) Acts (Continuation of Contributions) Order, 1938, be approved. This Order authorised the continuance of subsidies for slum clearance and decrowding at the present rate on houses completed after March 31st, 1938. The present rate for slum clearance subsidy in Scotland was on a per capita basis of £2 10*s*., and £2 15*s*. in the case of rural areas, and therefore varied with the size of the family, that for two persons being £5, and for six persons £15. The subsidy under the 1935 Act, however, was at a flat rate for each house built, and amounted to £6 15*s*. per house. The average amount of subsidy for both decrowding and slum clearance amounted to slightly under £11 per house. Mr. T. JOHNSTON said there had been in Scotland a progressive deterioration in the amount of subsidy given to the local authorities during the past two or three years, and what the Government were doing now was to perpetuate a position in Scotland which the local authorities almost unanimously declared to be an impossible one, and one in which they did not feel that they could develop a large-scale building programme. While the subsidy was stabilised the cost of building had risen by over 25 per cent. In Scotland they had a 50 per cent. higher maternal mortality-rate than in England, and overcrowding was six times worse in Scotland than in England. The poor-law relief figure in Scotland was 2½ times worse than in England. Almost one-third of the people of Scotland were living more than two to a room, and in the burghs there were 300,000 houses without a separate water-closet. While the Labour Party could not vote against this Order on the ground that they could not take the responsibility for discontinuing the subsidy they must emphatically protest against the Government permitting the profiteering in house building materials in Scotland and thus permitting a depreciation in the value of the subsidy. Mr. ELLIOT, Secretary of State for Scotland, said it was common knowledge that there was great disquietude in the House of Commons and in Scotland as to the housing situation. They had already large building programmes, but it was in execution that they fell short. They were not getting inferior grants in Scotland to those in England, but the question really was, why they could not make as good use of them in Scotland as south of the border. Local authorities should give attention to alternative methods of building, particularly to the timber house, as a possible source of relief. The number of houses being built and approved was still as high as it had ever been, even during the trough of low prices. That showed that the rise in cost had not discouraged local authorities from going on with houses. They must concentrate upon the most desperate problem—namely, the getting rid of the terrible dens and slums which existed. After that they would move on to other problems, but when there was only so much labour available they must in this case take the worst things first.

Sale of Contraceptives

On March 30th in the House of Commons Mr. R. J. RUSSELL introduced a Bill to regulate the public display in shops of contraceptives and matter descriptive thereof, to prohibit street trading in such articles, and to restrict their public advertisement. He emphasised the increasing development throughout the country, especially in the metropolitan area, of publicity with regard to contraceptives and their display and sale. By inquiry he had found that of 280 chemists' shops only seven did not stock and distribute contraceptives. In addition a large number of shops now dealt in contraceptives only, and in such a way as to be an offence to a large portion of the population. In one district alone there were 36 of these stores, apart from the chemists' shops. There was also a growing custom of buying these things through slot machines, and in factories and workshops touts were pushing these articles and information about their use. The country districts were also becoming infiltrated with the same thing. Under the terms of this Bill, if a dealer attempted to send these things or information about them to unmarried persons under 18 he would be guilty of an offence. But there was nothing in the Bill which would stop the sale of contraceptives to those who needed them, either by chemists or other stores conducted in a proper manner. Mr. THURTLE opposed the Bill partly on utilitarian grounds and partly because he believed that a private Member was not the right person to bring in such legislation. He did not know how extensive this evil might be, but if it was a real evil it ought to be dealt with by the Government Department concerned—namely, the Home Office. They had to remember that the practice of birth control in this country, whether they liked it or not, was very widespread, and while no one wished to see advertisements regarding birth control set out in an offensive manner, or contraceptive equipment exposed objectionably, they must recognise that this was lawful information for the men and women of the country, and Parliament ought not to make it unduly difficult for them to get that information and the necessary equipment.

Detention under the Mental Deficiency Act

After making full inquiry the Minister of Health has informed Mr. Logan that the action taken with respect to Mr. Hargreaves (see *Lancet*, April 2nd, p. 811) was the consequence of a mistake in the office of the Board of Control, which he deeply regrets. A sum of £200 has been accepted by Mr. Hargreaves in compensation for his distressing experience.

In the House of Lords on March 30th the Royal Assent was given to the Blind Persons Act, the Population (Statistics) Act, and the National Health Insurance (Amendment) Act.

In the House of Lords on April 5th, on the motion of Viscount GAGE, the following noble Lords were appointed to join with a committee of the House of Commons in the consideration of the Food and Drugs Bill: the Earl of Onslow, the Earl of Birkenhead, Lord Teynham, the Earl of Listowel, Lord O'Hagan, Lord Addington, and Lord Doverdale.

In the House of Commons on March 31st Sir Douglas Thomson introduced the Nursing Homes Registration (Scotland) Bill, which provides for the registration and inspection of nursing-homes in Scotland.

QUESTION TIME

WEDNESDAY, MARCH 30TH

H.M.S. *Caledonia*

Mr. GALLACHER asked the First Lord of the Admiralty whether he had any information concerning the outbreak of disease among boys on board H.M.S. *Caledonia*; how many cases had been reported of scarlet fever, middle-ear disease, and rheumatic fever; how many had been removed to shore hospitals with rheumatic hearts; and what steps were being taken to cope with this situation. —Mr. DUFF COOPER replied: The number of cases of scarlet fever and rheumatic fever that have occurred among boys in H.M.S. *Caledonia* since May 10th, 1937, when the first entries were made, are 74 and 31 respectively. The number of cases of middle-ear disease to Dec. 31st, 1937, was 20; since then there have been 30 cases of ear trouble but how many of these were middle-ear disease is not known. I am obtaining the

information and will communicate it to the hon. Member. Seven boys suffering from rheumatism with heart complications have been sent to civil hospitals on shore. These numbers are not greater than are to be expected periodically in institutions of the type and size of H.M.S. *Caledonia*, and at the present time the amount of sickness there is declining. The position is being carefully watched and all the usual precautions to limit the spread of infectious disease are in force.

Mr. GALLACHER: In view of the very grave concern felt by the families of these lads—is the right hon. gentleman aware, for instance, that a mother gets a message that her boy has been sent home in an ambulance, and another writes to say that she is in a terrible state of distress because of the condition her boy has come home in—will he put an end to this *Caledonia* which is a death ship, and give the boys proper quarters on shore and proper diet?—Mr. DUFF COOPER: I can assure the hon. Member that the conditions on the *Caledonia* are extremely modern and up to date, and I shall be very pleased if he will take an opportunity to visit it for himself, when I am sure he will be very satisfied. I do not think that the amount of disease that has occurred among the 1000 boys and more would compare unfavourably with any similar institution in this country.

THURSDAY, MARCH 31ST

Hospitals Survey

Mr. ROBERT MORRISON asked the Minister of Health what was the purpose of the recent survey of voluntary hospitals carried out by his department; if the information was being collected as part of the air-raid precautions scheme; and whether it would be communicated to the local authorities.—Sir KINGSLEY WOOD replied: The survey, which is not limited to voluntary hospitals, has been undertaken with a view to making the fullest use of the existing hospital facilities, and extending them if necessary in a national emergency. The results of the survey will in due course be a matter for discussion with the local authorities.

Naval Medical Officers and Marriage Allowances

Sir JOHN ANDERSON asked the First Lord of the Admiralty whether he was yet in a position to announce any decision with regard to the extension of the privilege of marriage allowances to officers of the medical branch of the Royal Navy.—Mr. Shakespeare, Parliamentary Secretary to the Admiralty, replied: As I mentioned in the debate on the Estimates I was sorry the time had not permitted of a complete investigation of the application of marriage allowance to medical officers. It has now been decided that there is no reason for making any difference in the case of these officers, and it has just been announced to the Fleet that they will receive marriage allowances under the same conditions as other naval officers.

Non-stamping of Health Insurance Cards

Mr. DAY asked the Minister of Health whether he would give particulars of the number of persons who had been summoned during the three months ended to the last convenient date for failing to stamp the health insurance cards of their employees.—Sir KINGSLEY WOOD replied: The number of persons who were summoned during the period of three months ended Dec. 31st, 1937, for failing to stamp National Health Insurance contribution cards was 383.

Psychological Treatment of Prisoners

Sir RALPH GLYN asked the Home Secretary whether his attention had been drawn to a case at the Lewes assizes when, on March 15th, sentence was passed on two persons of 6 months' and 18 months' hard labour, respectively, in spite of the recommendation by counsel for the defence and medical testimony of the need for these persons to have psychological treatment; and whether, in view of this and other cases, he would consider the possibility of establishing, after consultation with eminent alienists, an institution on the lines of, although smaller than, Broadmoor where cases could be dealt with which were aggravated by prison treatment.—Sir SAMUEL HOARE replied: The psychological treatment of prisoners has been the subject of a special investigation by my medical advisers during the last few years and they hope shortly to present a report. When this report has been received I shall be in a better position to consider the general problem raised by the question of my hon. friend. It must, however, be remembered that the object of a sentence is not only to check the criminal propensity of the offender but to deter others from committing similar offences.

TUESDAY, APRIL 5TH

Health Insurance Benefits and Incurable Illnesses

Mr. PARKER asked the Minister of Health whether he proposed to use the national health insurance funds to give increased benefits to those disabled by incurable illness.—Mr. BERNAYS, Parliamentary Secretary to the Ministry of Health, replied: Provision is already made under the scheme of National Health Insurance for persons who were insured under the Acts at the time when they became disabled. Such persons, as soon as they have paid 104 weekly contributions, become entitled to disablement benefit up to the age of 65 and thereafter to an old age pension for the rest of life. Any approved society which has a disposable surplus on valuation may apply part of it to increasing the standard rate of disablement benefit, and societies covering a high percentage of the whole insured population have in fact done so.

DIVISION OF THE PRELIMINARY STATE EXAMINATION FOR NURSES

AT a meeting of the General Nursing Council for England and Wales held on March 25th, the following resolution was passed:—

"That the Council approve of the division of the preliminary State examination into two parts; Part I of the examination, which may be taken before entry to a training school, shall include the subjects of anatomy, physiology and hygiene. A candidate taking Part I of the examination before entrance to a training school will be required to produce evidence that she has undergone a course of instruction, approved by the General Nursing Council, which shall include the above subjects. The minimum age of entry to Part I of the examination shall be 18 years. The education and examination committee be requested to submit draft regulations for giving effect to this resolution."

The resolution was proposed by Miss H. Dey, matron of St. Bartholomew's Hospital, who accepted an amendment by Sir Frederick Menzies. A further resolution proposed by Miss E. MacManus, matron of Guy's Hospital, was also passed—that a statement that the Council approved of the division of the preliminary State examination should be included in the evidence to be given by the Council before the Interdepartmental Committee on Nursing on March 29th.

The division of the preliminary State examination was the subject of recommendations XL to XLIII of THE LANCET Commission on Nursing and was decided on by the General Nursing Council for Scotland in June, 1932.

FOOT-AND-MOUTH DISEASE.—Cattle with epizoötic aphthæ were, it seems, sent to Banbury market on March 24th and distributed thence over a wide area. This has led the Ministry of Agriculture to impose a standstill order over the greater part of England in order to give time to regain control of the position. New outbreaks were reported yesterday from places in Bedfordshire, Berkshire, and Wiltshire. The order prohibits the movement of cattle, sheep, pigs, and goats, except by licence, as well as the holding of markets except of fat-stock for immediate slaughter.

MEDICAL NEWS

University of London

Lieut.-Colonel H. E. Shortt has been appointed to the university readership in medical parasitology tenable at the London School of Hygiene and Tropical Medicine.

Colonel Shortt, who is 50 years of age, was educated at the University of Aberdeen where he obtained the degree of M.B. in 1910. He entered the Indian Medical Service and was appointed to the central laboratory at Basra as protozoologist. During the late war he became assistant malaria officer and later chief malaria officer to the Mesopotamian Expeditionary Force, and he was afterwards appointed officer commanding the central laboratories at Basra and Baghdad. In 1922 he went to Assam as director of the Pasteur and Medical Research Institute at Shillong. In 1924 he joined the Kala-azar Commission as protozoologist and in 1926 succeeded Sir Rickard Christophers as director of that body, being responsible for the second report of the Commission issued in 1932. A year previously he had been made director of the Pasteur Institute of India at Kasauli, and in 1934 he took charge of the Central Research Institute there. Since 1934 he has been director of King Institute of Preventive Medicine at Madras. He was president of the medical and veterinary section of the Indian Science Congress when it met in 1936, and in the same year he obtained his M.D. degree and the diploma in tropical medicine and hygiene. Colonel Shortt has delivered lectures at university continuation courses and at the London School of Hygiene and Tropical Medicine, and has examined regularly for the M.D. degree of the University of Madras. He has published many papers on medical parasitology.

At recent examinations the following candidates were successful :—

D.M.R.

Part I.—E. P. Allen, Philip Beinart, J. W. D. Bull, A. G. S. Cooper, N. F. C. Hill, D. J. Hurrell, C. W. S. Jerram, B. Y. Mina, S. F. Oosthuizen, K. M. Rai, Philippa N. Vaus, and H. H. Winterstein-Gillespie.

University of Dublin

At recent examinations at the School of Physic, Trinity College, the following candidates were successful :—

M.D.

A. A. Lisney and C. J. de V. Shortt.

FINAL MEDICAL EXAMINATION FOR M.B., B.CH., B.A.O.

Therapeutics and Pathology.—Samuel Fine, L. E. Morris, and David Selman (with first-class honours); J. M. Dougan, J. D. Whiteside, H. D. Chomse, and B. S. Good (with second-class honours); R. R. Hogg, E. R. F. Mellon, J. R. C. Holmes, A. H. Isaacson, P. C. Denham, Arthur Graham, Kyrl T. Acton, Sheila Kenny, M. N. O'Riordan, W. B. Welply, T. H. Downes, and M. H. Waters.

Medicine.—H. J. R. Henderson, D. G. Harrison, T. W. Hanna, J. T. Speidel, R. A. Lutton, W. J. E. Pietersen, L. I. Warnock, Ronald Brass, L. N. Lynch, J. E. Murphy, and V. T. Williams.

Surgery.—J. C. M'Neilly, W. T. Kenny, and M. F. X. Slattery (with second-class honours); H. M. Buchanan, T. P. Griffin, B. W. Hughes, W. J. E. Pietersen, H. J. R. Henderson, Stella M. Coen, M. C. Warnock, and Thaddeus Fallon.

Midwifery.—T. L. Lawson, H. A. Dougan, and F. H. Counihan (with first-class honours); Robert Wilson, Brian Mayne, G. E. Nevill, J. C. de R. Sugars, and R. T. Burkitt (with second-class honours); W. W. McGrath, J. W. Boland, D. M. R. Barry, Miriam A. Becket, J. G. Waugh, E. W. R. Hackett, Deborah Bloom, Mary C. Conlin, H. R. T. Devlin, Muriel Elliott, F. D. F. Steede, W. C. Good, D. B. Taylor, S. L. Wray, R. S. M. Cooke, Emily E. E. E. Hill, J. W. Cathcart, W. A. J. Pike, G. D. Stevenson, T. W. Buckley, R. J. Grove-White, J. R. Murdock, D. A. Huggard, F. W. Parke, R. W. Temple, M. E. C. Balmer, D. B. George, J. L. Mans, and D. K. Stewart.

D.G.O.

M. S. El Kinany and Sarala Ghosh.

D.P.H.

Part I.—Eveleen M. H. Scott, Charlotte F. Pike, D. P. P. Berney, J. L. O'Neill, and Francis Keane.

D.P.M.

Part II.—D. T. Bardon.

National University of Ireland

At recent examinations at University College, Cork, the following candidates were successful :—

D.P.H.

V. J. Dillon (with first-class honours), J. G. O'Brien, T. P. P. O'Riordan (with second-class honours), and Helen P. Tracy.

A Double Anniversary

On April 2nd, at Kettner's Restaurant, Sir Henry Gauvain was entertained to dinner by the past and present resident medical officers of the Lord Mayor Treloar Cripples' Hospital and College, Alton, to commemorate the thirtieth anniversary of the hospital and Sir Henry's silver wedding. Dr. C. E. M. Jones, who has been resident at the hospital for 19 years, was in the chair.

Society of Apothecaries of London

At recent examinations the following candidates were successful :—

Surgery.—H. B. O. Cardew, Guy's Hosp.; A. P. Motley, Royal Colleges, Edin.; J. C. B. Nesfield, Camb. and St. Mary's Hosp.; and B. Oppenheim, Manch.

Medicine.—G. H. L. Bullmore, Univ. Coll. Hosp.; J. D. B. Perkins, Guy's Hosp.; and E. F. G. Stewart, St. Bart.'s Hosp.

Forensic Medicine.—G. H. L. Bullmore, Univ. Coll. Hosp.; L. L. Gottlieb, Frankfurt and Lond. Hosp.; J. D. B. Perkins, Guy's Hosp.; and E. F. G. Stewart, St. Bart.'s Hosp.

Midwifery.—P. C. Conran, Camb. and Middlesex Hosp.; E. L. Moll, Guy's Hosp.; E. S. Nicholson and T. E. Oot, Oxford and Guy's Hosp.; and J. A. Taylor, Sheffield.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery: G. H. L. Bullmore, L. L. Gottlieb, B. Oppenheim, and J. D. B. Perkins.

University of Aberdeen

At a graduation held on March 30th the hon. degree of LL.D. was conferred on Dr. Gunnar Dahlberg, director of the Institute of Medical Genetics at Upsala, Sweden. Diplomas in public health were also conferred on Mary E. Harrow and W. D. Wilson.

Fellowships in Psychiatry

Particulars will be found in our advertisement columns of three fellowships offered by the Child Guidance Council.

The fellowships, each of £300, are tenable for a year for half-time work at the London Child Guidance Clinic, 1, Canonbury-place, London, N. Applications should be sent to the secretary of the council, Woburn House, Upper Woburn-place, London, W.C.1, before May 10th.

Milk Pasteurisation

The Royal Sanitary Institute (90, Buckingham Palace-road, London, S.W.1) is giving a further course of lectures and demonstrations on pasteurisation, for medical officers of health, sanitary inspectors, and others interested, on May 26th and 27th.

Papworth Village Settlement

On May 14th, at 3 P.M., Dr. Walter Pagel will give a demonstration at the settlement on the allergic tissue reaction and the allergic disease. Medical practitioners who wish to attend are asked to let Dr. Pagel know in advance.

Royal Navy Medical Club

The twenty-fourth annual dinner of this club will be held at the Trocadero Restaurant, London, W., on Friday, April 22nd, at 8 P.M. Particulars can be had from the hon. secretary (Surgeon Commander M. B. Macleod, R.N.), Medical Department, Admiralty, London, S.W.1.

International Congress of Tropical Medicine and Malaria

The third International Congress of Tropical Medicine was to have met at Amsterdam in 1932, and the third International Malaria Congress at Madrid in 1935. Both had to be postponed. It is now proposed to hold a joint congress at Amsterdam from Sept. 24th to Oct. 1st under the presidency of Dr. G. Gryns. The programme for the section of tropical medicine includes deficiency diseases, filariasis, leptospirosis, yellow fever, and vaccination against plague; in the section of comparative tropical pathology measures against hydrophobia, rickettsia, and the extirpation of the tsetse fly will also be discussed. Prof. N. H. Swellengrebel will preside over the malaria congress when thirty workers are each giving a short address on a subject of their own choice. They will include Sir Rickard Christophers, F.R.S. (respiratory metabolism of *Plasmodium knowlesi*), Colonel S. P. James, F.R.S., and Prof. M. Ciuca (species and races of malaria parasites: experimental pathology and immunity), Lieut.-Colonel J. A. Sinton, F.R.S. (immunity in malaria), Sir Malcolm Watson (the prevention of malaria in Malaya, 1900–37), and Dr. D. Bagster Wilson (infection and immunity in some tribes of Tanganyika). Speakers in the other sections will include Sir Robert McCarrison, Dr. N. Hamilton Fairley, and Dr. G. M. Findlay. Further information may be had from the secretary of the congress Mauritskade, 57, Amsterdam, O.

Congress of Medical History

The eleventh International Congress of Medical History will take place in Jugoslavia from Sept. 1st to 12th under the presidency of Prof. Thaller Lujo. Sessions will be held at Zagreb, Belgrade, Sarajevo, and Dubrovnik. Further information may be had from the secretary-general of the congress, Dr. Vladimir Bazala, Vlaska Ulica 95/1, Zagreb, Jugoslavia

Glasgow University Club, London

This club will dine at the Trocadero Restaurant, London, W., on Friday, May 27th, at 7.30 P.M., when Prof. E. P. Cathcart, F.R.S., will be in the chair. Any Glasgow University men who, though not members of the club, wish to attend are asked to write to the hon. secretaries, 62, Harley House, London, N.W.1.

Royal Microscopical Society

A meeting of this society will be held at B.M.A. House, Tavistock-square, London, W.C., on Wednesday, April 20th, at 5.30 P.M., when Prof. R. Ruggles Gates, F.R.S., will read a paper on the structure of the chromosome. Dr. J. A. Murray, F.R.S., will communicate a paper for Dr. Miles Johnston on some methods of preparing fish otoliths for examination.

Ophthalmological Society of the United Kingdom

This society will hold its annual congress at the house of the Royal Society of Medicine, 1, Wimpole-street, London, W., from April 28th to 30th, under the presidency of Dr. Gordon Holmes, F.R.S. Apart from a discussion on the differential diagnosis of the causes of exophthalmos, the meeting will be devoted to personal communications. The secretary is Mr. L. H. Savin, 7, Queen-street, W.1.

Prize for Medical Jurisprudence

The next award of the Swiney prize which is decided by a joint committee of the Royal Society of Arts and the Royal College of Physicians will be made in January, 1939. The prize, which consists of a cup and the sum of £100, is offered alternately for the best published work in medical and general jurisprudence, and as the last award of the prize in 1934 went to Sir William Holdsworth for his work, "A History of English Law," this time it will be offered for medical jurisprudence. Applications should be sent to the secretary of the Royal Society of Arts, John-street, London, W.C.2, before Nov. 30th.

Medical Research in Canada

As announced in our issue of Feb. 26th, Sir Frederick Banting, F.R.S., director of the department of medical research at the University of Toronto, has been nominated by the National Research Council as chairman of a new committee to study the organisation of medical research in Canada. This action follows the recommendation of a conference attended by representatives of all the medical schools, organisations and institutions concerned in medical research. The committee will include as ex-officio officers the president of the National Research Council, the Deputy Minister of the Department of Pensions and National Health, the president of the Canadian Medical Association, and the president of the Royal College of Physicians and Surgeons of Canada, together with twelve members of the medical profession with specialised knowledge in a particular field and knowledge of Canada's requirements in medical research. It has been suggested that the formation of this committee under the National Research Council might well be a first step towards the formation of a medical research council for Canada similar to the one in Great Britain and it is understood that when a purely medical research council becomes necessary there will be no opposition, but all possible assistance, from the National Research Council. One of the first steps to be taken by the present committee will be to survey the work in progress at various centres so as to determine how it may be developed to the best advantage. It is felt that better dissemination of information will greatly enhance the opportunities of the research workers to make their efforts effective.

Importation of Meat

The importation into this country of all meat and meat products will henceforth be permitted only if they are accompanied by an official certificate recognised by the Minister of Health as evidence of satisfactory inspection and hygienic preparation. Besides the certificates already recognised for 31 countries, the Minister has now recognised official certificates for France, Kenya Colony, and South West Africa.

Royal Medical Benevolent Fund

At the annual general meeting of the Fund, held on April 5th, the accounts for 1937 were presented, from which it appears that 236 annuities amounting to £6248 were granted to aged and infirm persons, in addition to 431 annual allowances amounting to £12,120. The Fund also accepted responsibility for disposing of nearly £2000 on behalf of other societies in special grants for education and maintenance. During the twelvemonth the Ladies' Guild were in a position to make their own grants amounting to nearly £5000, not including the value (estimated at £1000) of clothing distributed during the year. A further £1000 was distributed by the Guild on behalf of other societies. It was decided, instead of printing a formal report this year, to send a personal letter to all the subscribers and donors explaining the objects of the Fund and its various activities. Sir Thomas Barlow was re-elected president, Dr. Lewis Glover hon. treasurer, and Mr. R. M. Handfield-Jones hon. secretary.

Insurance of Young Workers

From the beginning of this week workers between the ages of 14 and 16 become insurable under the National Health Insurance Acts for the purpose of receiving medical benefit. The rate of contribution is 4*d*. a week, of which 2*d*. is payable by the employer and 2*d*. by the worker, and the number of boys and girls immediately affected is about 1,000,000. These juvenile contributors are eligible to join approved societies and are advised to do so. The new entrants are each to receive a personal message from Sir Kingsley Wood as follows:—

> "The medical card which is sent to you by the insurance committee with this letter enables you to choose a doctor. You should make your choice now, so that you will know to whom you may go for medical treatment and advice when you require it.
>
> "What I, as Minister of Health, want to impress on you is that the future of our country largely depends on the health and fitness of you young men and women. You can play your part by doing all you can to keep fit and well. If you have occasion to go to the doctor, you should remember to act upon any advice which he gives you for the future. This may make all the difference to your health and happiness in after life."

A pamphlet about the scheme (memorandum 335X) may be had from any local office of the Ministry of Health, the Welsh Board of Health, or the Ministry of Labour.

Education of the Body

A course of 20 lectures on national fitness is being given at Olympia, and on Tuesday last Lord Dawson presided when Captain S. J. Parker, chief inspector of physical training of the Board of Education, gave an introductory address. "Just think for a moment of the daily existence of millions of our citizens," said Captain Parker. "Can you imagine anything further removed from the life of a healthy animal; anything which is less likely to produce an efficiently functioning and well-developed body? It is natural life seen in a distorting mirror. Comfort and speed—are they not becoming our greatest enemies? The logical conclusion of this line of development seems to me to be a palpitating brain carried on a mechanically-propelled litter." Both at work and in recreation, the speaker declared, we tended more and more to sedentary and indoor pursuits. It had become necessary to safeguard mental and physical health by means of wisely directed physical education. This should include not only gymnastics, games, swimming, and dancing but sports, walking-tours, camping, and all forms of recreation and exercises likely to inculcate a love of the open air and a healthy way of living. Physical education should build up physical efficiency, strength, and endurance. It should cultivate correct posture and it should develop neuro-muscular control.

Medical Diary

April 11th to April 16th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY.

United Services. 4.30 P.M., annual general meeting. Colonel E. M. Cowell: The Organisation of Medical Services in Air-raid Precautions.

TUESDAY.

General Meeting of Fellows. 5.30 P.M., ballot for election to the Fellowship.

Psychiatry. 8.30 P.M., Dr. W. S. Maclay (in collaboration with Dr. E. Guttmann and Dr. W. Mayer-Gross): Spontaneous Drawings ("Doodles") as an Approach to some Psychopathological Problems.

SOCIETY FOR THE STUDY OF INEBRIETY.

TUESDAY.—4 P.M. (11, Chandos-street, W.), annual meeting. Dr. Adolphe Abrahams: Alcohol, Tobacco, and Other Drugs in Relation to Physical Efficiency.

PADDINGTON MEDICAL SOCIETY.

TUESDAY.—9 P.M. (Paddington Town Hall, Harrow-road, W.), Mr. Douglas Macleod: The Conduct of Midwifery in General Practice.

SOUTH-WEST LONDON MEDICAL SOCIETY.

WEDNESDAY.—9 P.M. (Bolingbroke Hospital, Wandsworth-common, S.W.), clinical meeting.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

UNIVERSITY OF GLASGOW.

TUESDAY.—4.30 P.M. (Tennent Memorial Building, Church-street), Dr. J. Burdon-Cooper: The Non-surgical Treatment of Cataract.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.

MONDAY.—2.30 P.M., Sir Edmund Spriggs: Diseases of Small and Large Intestine.

WEDNESDAY.—Noon, clinical and pathological conference (medical). 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Dr. C. H. Andrewes: Recent Work on Viruses.

THURSDAY.—2.15 P.M., Dr. Duncan White: radiological conference. 3.30 P.M., Mr. L. Carnac Rivett: Benign Neoplasms of Uterus. 4.30 P.M., Mr. Kenneth Walker: Venereal Diseases.

Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W.

TUESDAY.—5.30 P.M., Dr. T. F. Cotton: Rheumatic Heart Disease in Children and its Treatment.

LEEDS GENERAL INFIRMARY.

TUESDAY.—3.30 P.M., Mr. George Armitage: Recent Developments in the Treatment of Prostatic Enlargement.

Vacancies

For further information refer to the advertisement columns

Accrington, Victoria Hosp.—H.S., £175.
Ashton-under-Lyne Lake Hosp. and Darnton House Institution.—Sen. Res. M.O., at rate of £250.
Bedford County Hosp.—H.S., at rate of £155.
Birkenhead, Clatterbridge (County) General Hosp.—Sen. Res. M.O., £350.
Blackburn, Queen's Park Hosp. and Institution.—Res. Jun. Asst. M.O., £200.
Blackburn Royal Infirmary.—Res. H.P., £175.
Board of Control, Northumberland-avenue, W.C.—Commissioner, £850.
Bolton Education Committee.—Asst. M.O.H. and Asst. School M.O., £500.
Bradford City.—Asst. City Pathologist, £500.
Brentford and Chiswick Borough.—Ophth. Surgeon, £2 12*s.* 6*d.* per session.
Brighton Education Committee.—Asst. School M.O., &c., £500.
Bristol City and County.—Asst. M.O.H., £500.
Bristol University.—Sen. Clin. Pathologist, £700–£800.
British Postgraduate Medical School, Ducane-road, W.—First Asst. in Dept. of Obstet. and Gyn., £250–£500.
Buxton, Devonshire Royal Hosp.—H.P., at rate of £150.
Canterbury, Kent and Canterbury Hosp.—Hon. Anæsthetist.
Capetown City.—Tuberculosis Officer, £800.
Cardiff, King Edward VII Welsh National Memorial Assoc.—Asst. Res. M.O. for North Wales Sanatorium, £200.
Central Middlesex County Hosp., Willesden, N.W.—Jun. Res. Asst. M.O., at rate of £250.
Chelmsford County Council.—Temp. Tuberculosis Officer, £15 per week.
Chester Royal Infirmary.—H.P., £150.
Chorley and District Hosp.—H.S., at rate of £150.
Coventry and Warwickshire Hosp.—Cas. O., H.P., two H.S.'s, and H.S. to Ophth. Dept., each at rate of £150.
Croydon County Borough.—Asst. M.O.H. and Asst. School M.O., £500.
Dartford, Bergman Osterberg College.—Lecturer in Physiology and Hygiene.
Derbyshire Royal Infirmary.—H.P., and H.S. for Ear, Throat, and Nose Dept., each £150.
Devonport, Prince of Wales's Hosp.—Jun. H.S., at rate of £120.
Dreadnought Hosp., Greenwich, S.E.—H.P., at rate of £110.
Dundee Royal Infirmary.—M.O. in Med. Elect. Dept., £1000.
Gravesend Borough.—Asst. M.O.H. and School M.O., £600.
Great Yarmouth General Hosp.—H.S., £140.
Herefordshire County Council.—Asst. County M.O. and M.O.H., £800.
Holborn, Metropolitan Borough.—Asst. M.O., £600.
Hosp. for Consumption and Diseases of the Chest, Brompton, S.W.—Res. Surg. O., at rate of £150. Asst. Res. M.O. and three H.P.'s, at rate of £150 and £50 respectively. Also Asst. Physician.
Hostel of St. Luke, 14, Fitzroy-square, W.—Res. M.O., at rate of £200.
Hull Corporation, Health Department.—Asst. M.O.H., £600.
Kent County.—Asst. Tuberculosis Officer, £600.
King Edward Memorial Hosp., Ealing, W.—H.S. to Spec. Depts., at rate of £150. Also Cons. Physician and Second Cons. Laryngologist.
Leeds Public Dispensary and Hosp.—Cas. O., H.S., and H.P., each at rate of £150.
Leicester, County Sanatorium and Isolation Hosp., Markfield.—Jun. Res. M.O., at rate of £300.
Liverpool and District Hosp. for Diseases of the Heart, 34, Oxford-street.—H.P., at rate of £100.
Llanelly Borough.—Asst. M.O.H. and School M.O., £500.
London Chest Hosp., Victoria Park, E.—Surg. and Med. Regs., £225 and 175 respectively.
London Child Guidance Clinic, 1, Canonbury-place, Islington, N.—Three Fellowships in Psychiatry, each £300.
London County Council.—Part-time Cons. Pædiatrist, £125.
London Lock Hosp., 283, Harrow-road, W.—Res. M.O., at rate of £175.
Manchester, Christie Hosp. and Holt Radium Institute.—Asst. M.O. to Radium Institute, £400.
Manchester Hosp. for Consumption, &c.—Asst. M.O. for Crossley Sanatorium, £200.
Manchester Royal Infirmary.—M.O., to Out-patients, £105.
Metropolitan Hosp., Kingsland-road, E.—Sen. and Jun. H.P.'s and H.S.'s, each at rate of £100.
Middlesex County Council.—Asst. Dental Officer, £500.
Mount Vernon Hosp., Northwood.—H.S., at rate of £150.
Newport, Mon, Royal Gwent Hosp.—Res. Surg. O., £250. Also H.S. to Fracture and Orthopædic Dept. and Cas. O., each £135.
Northampton County Mental Hosp.—Deputy Med. Supt., £600.
Norwich, Norfolk and Norwich Hosp.—Cas. O., £120.
Pontefract General Infirmary.—Sen. Res. M.O., at rate of £175.
Preston and County of Lancaster Royal Infirmary.—H.S. to Eye, Ear, Nose, and Throat Dept., at rate of £150.
Queen Charlotte's Maternity Hosp., Marylebone-road, N.W.—Res. Anæsthetist, at rate of £100.
Queen Mary's Hosp. for the East End, Stratford, E.—Hon. Asst. Surgeon.
Richmond Royal Hosp., Surrey.—Jun. H.S., £100.
Rochdale Infirmary and Dispensary.—Second H.S., £150.
Rotherham Hosp.—H.P., £180.
Royal Cancer Hosp., Fulham-road, S.W.—Second Asst. Pathologist, £300.
Royal Chest Hosp., City-road, E.C.—Res. M.O., at rate of £150. H.P., at rate of £100. Also Clin. Asst.
Royal Naval Medical Service.—Medical Officers.
Royal Northern Hosp., Holloway, N.—Clin. Asst. to Ear, Nose, and Throat Dept.
Royal Waterloo Hosp. for Children and Women, Waterloo-road, S.E.—Res. Cas. and Orth. H.S., at rate of £150. H.P., at rate of £100. Also Hon. Surg. Reg.
Samaritan Free Hosp. for Women, Marylebone-road, N.W.—H.S., at rate of £100.
Sheffield, Jessop Hosp. for Women.—Res. M.O., at rate of £150.
Stepney Metropolitan Borough.—Tuberculosis Officer, &c., £750.
Stoke-on-Trent, Burslem, Haywood, and Tunstall War Memorial Hosp.—Res. H.S., at rate of £175.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—Res. Anæsthetist, at rate of £150.
Surrey County Sanatorium, Milford, nr. Godalming.—First Asst. M.O., £570.
Torquay Borough.—Deputy M.O.H. and Asst. School M.O., £600.
Tunbridge Wells, Kent and Sussex Hosp.—H.S., £150.
University College Hosp. Medical School.—Beit Memorial Scholarships for Medical Research, £400.
University of London.—Chair of Anatomy, at London Hosp. Med. College, £1000.
West London Hosp., Hammersmith, W.—Additional Hon. Reg. to Throat, Nose, and Ear Dept.
Willesden General Hosp., Harlesden-road, N.W.—Hon. Clin. Asst. to Med. Out-patient Dept.
Winchester, Royal Hampshire County Hosp.—Two H.S.'s, each at rate of £100.
Windsor, King Edward VII Hosp.—Cas. O., £120.
Wolverhampton, New Cross Hosp.—Res. Asst. M.O., £200.
York County Hosp.—H.S. to Eye, Ear, Nose, and Throat Dept., £150.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Banff (Banff), Fareham (Hants), and Finedon (Northants).

Medical Referee (or Referees) under the Workmen's Compensation Act, 1925, for Neath and Port Talbot (Circuit No. 30); Aberayron; Cardigan; Carmarthen, Llandilo Fawr, and Ammanford; Lampeter; Llandovery; Llanelly; Newcastle-in-Emlyn (Circuit No. 31). Applications should be addressed to the Private Secretary, Home Office, Whitehall, London, S.W.1, before April 25th.

NOTES, COMMENTS, AND ABSTRACTS

SUPPLY OF VITAMINS A AND C ON A NORWEGIAN HUNTING EXPEDITION DURING A WINTER IN GREENLAND

BY ARNE HØYGAARD
AND
HARALD WAAGE RASMUSSEN

THE data reported here are the outcome of some studies made on an expedition to Angmagssalik, East Greenland, in 1936–37. The chief purpose was to inquire into the physiology of Eskimos, and the results of these are reported elsewhere (Høygaard 1937). Here we propose to deal only with the examination of the crew from a Norwegian hunting vessel.

The ship came to Angmagssalik in August, 1937, after having wintered in Loch Fine, about 74° N.L. The crew of 12 men came straight to our laboratory from the ship as soon as it had anchored in the harbour. During the winter none of them had been ill; there were no records of scurvy or nervous disturbances. On the journey from Loch Fine to Angmagssalik the captain for a fortnight suffered from beri-beri.

EXAMINATION OF CREW

The crew was examined in the following way :—

1. *Clinically* in order to detect signs of avitaminoses, such as bleedings in the joints, œdema, or abnormalities of the skin. The cavity of the mouth was inspected by the dentist, Dr. P. O. Pedersen. The pulse-rate was noted, the blood pressure registered, and heart and lungs were examined.

2. *The ascorbic acid in the blood* was determined by the method of Emmerie and van Eekelen. The normal amount of ascorbic acid in human blood has not yet been accurately determined, but figures lower than 0·3 mg. per 100 c.cm. must certainly be regarded as indicating deficiency in vitamin C.

3. *Hemeralopia.*—This was estimated by the method recently described by Edmund and Clemmesen (1937) and to which Helga Frandsen (1935) also refers. It can generally be assumed that when the value for the power of distinction of the eye is less than 1·25 with Tscherning glass 4, some degree of hemeralopia is present. In many cases examined by this method we have ascertained that the power of distinction increases after intramuscular injection of vitamin A. In the cases referred to the men's vision was adapted to darkness for half an hour before the examination.

RESULTS

None of the men showed signs of scurvy. Slight inflammation of the gums was frequent, but according to the dentist this was due to bad hygienic conditions of the mouth. The captain suffered from definite beri-beri with much œdema in the lower extremities, but without any neurological symptoms. He was a little emaciated but he could walk about with some difficulty. Pulse-rate was 68, blood pressure 135/85. The pupils were equal and reacted normally to light and accommodation. The Romberg test was negative. The patellar reflexes were normal and no anæsthetic areas could be detected on the lower extremities. Heart and lungs seemed quite normal. He was treated with yeast and the symptoms disappeared in less than a week (see Table).

Rank.	Age.	Power of distinction.	Mg. per 100 c.cm. ascorbic acid in blood.
Captain	45	1·00	0·54
First mate	54	1·00 –	0·19
Second mate ..	45	1·00	0·23
Gunner	30	1·00	0·19
Engineer	70	1·00 –	0·15
Steward	35	1·25 –	0·15
Cook	45	1·25 –	0·23
Sailor and gunner ..	50	1·25 –	0·28
„ „ ..	25	1·00	1·24
„ „ ..	23	1·00	0·27
Dog driver	43	1·00 +	..
Fireman	35	1·00 –	0·20

(A plus sign indicates that the power of distinction is a little better than that shown by the figure; a minus sign indicates that it is worse than the figure indicates. The instrument was adjusted on two normal individuals who had a distinction power of 1·50 and 1·75.)

Foodstuffs used on the "Quest."—Meat of musk-ox, three to four times a week; salt fish, twice a week; salt meat, once a week; pickled herring, once a week; two pigs, one killed for Christmas and one in April, 1937; potatoes, finished in March, 1937; dried potatoes, from March, 1937; peas and beans, three times a week; porridge, frequently; bread, margarine, some cheese, treacles; cranberry jam, sometimes; coffee, tea, sugar; lemons, until Christmas, one slice for each man in the tea.

DISCUSSION

On looking at the list of the foodstuffs from the ship one would expect to find avitaminoses A and C. The only sources of vitamin A worth mentioning are the herring, the meat, and the cheese, but it seems almost certain that not enough was consumed to make the quantity ingested sufficient. The same can be said of vitamin C. Doubtless the whole crew suffered from hypovitaminosis A, nine of them suffered from hypovitaminosis C, and one of them, the captain, suffered from beri-beri. He sometimes used to take ascorbic acid tablets and that may explain the relatively high amount found in his blood. The extraordinarily high figure (1·24 mg. per 100 c.cm.) found in one of the gunners cannot easily be explained.

It is generally assumed that the beri-beri that used to be found in the crew of sailing vessels was a combination of several deficiencies. In the case of the captain there was no deficiency of vitamin C, and he was cured with yeast without giving vitamin A. We may then conclude that his beri-beri was caused by lack of vitamin B only.

It is evident that a ship on which the whole crew is suffering from hemeralopia will not be very efficiently navigated and that the hunting, which is the object of the expedition, will suffer also. An especial danger is likely to arise during night-sailing along coasts where the navigation depends on the power of distinction and the colour-perception of the eye, which is also affected in hemeralopia (Edmund 1927). Generally it can be said that the ability of a hunter depends upon the power of distinction of his eyes. Our experience among the Eskimos shows that the best Eskimo hunters possessed the best power of distinction, and Gjessing, an ophthalmologist who has great experience in examining gunners from Norwegian whalers, agrees that this is so. It may

therefore be not only important but profitable to provide those on hunting expeditions with food rich in vitamin A.

The food on many merchant marine ships does not differ essentially from that supplied in our hunting vessels. It is thus probable that some of these ships are navigated by sailors suffering from hemeralopia, and here also it seems highly desirable to provide rations more rich in vitamin A.

SUMMARY

On a Norwegian hunting vessel wintering in the Arctic the crew of 12 men were examined for avitaminoses A and C, and an approximate list of the provisions on board was made. We found that the whole crew suffered from avitaminosis A and that 10 men suffered from hypovitaminosis C. The captain suffered from manifest beri-beri. We assume that these deficiencies may be present on whalers and merchant marine ships and diminish the efficiency of the crew both in hunting and in navigation by night.

REFERENCES

Edmund, C. (1927) *Trans. ophthal. Soc. U.K.* **47**, 319.
— and Clemmesen, S. (1937) *Nord. hyg. Tidskr.* **18**, 227.
Frandsen, H. (1935) Hemeralopia as an Early Criterion of A-avitaminosis, Copenhagen.
Høygaard, A. (1937) *Skr. Svalb. og Ishavet*, No. 74.

A SYMPOSIUM ON SILICOSIS

A COLLECTION of original papers on pneumoconiosis, contributed by well-known observers from various countries in Europe, is printed in the December issue of the Italian journal *Folia Medica*. Italy is one of the few great industrial countries in which silicosis is still not recognised for compensation; and these papers will serve to bring before Italian medical men the views, sometimes divergent, of various authorities on this complicated subject.

In an introductory paper Prof. Nicolo Castellino, director of the Institute of Industrial Medicine in Naples, refers to the Italian law of 1929, which provides compensation for certain industrial diseases as for accidents, and discusses the points for and against the recognition of silicosis as a compensatable industrial disease. The chief obstacle in the way of such recognition seems to be bound up with the difficulty in accepting silicosis as a definite entity. This is brought out in the paper contributed by Dr. C. Rist of the Paris Academy of Medicine, who admits the existence of silicosis as a distinct clinical syndrome but finds diagnosis impossible in the early stages. Dr. Rist discusses the obscurity of the pathology of silicosis—for example why continued exposure to siliceous dust determines silicosis in some operations and not in others; it is not certainly known even which are the dangerous forms of silica. The close association of silicosis and tuberculosis is imperfectly understood. Since tuberculous infection is the essential factor which makes possible the silicotic impregnation of the lungs, Dr. Rist suggests that the prophylaxis of silicosis should be based on three elementary principles: (1) protection of workers against the inhalation of mineral dusts; (2) medical examination of workers in dusty processes; and (3) preventive measures against tuberculosis. In a paper on the distribution of pneumoconiosis in Italy, Dr. P. C. Talini of Milan describes and illustrates the radiological characters of silicosis and mentions the industrial processes in which the disease is found in Italy; these present no distinctive features unknown in other countries.

Dr. L. Carozzi of Geneva quotes figures showing the heavy incidence of silicosis in those countries where the disease is recognised. He traces the development of theories of causation and the influence of various researches on modern views, and completes an instructive paper with a discussion on compensation. Dr. L. Teleky of Vienna writes on the scientific investigation of disease caused by dust. After referring to the action on the lungs of various kinds of dust he emphasises the care necessary in selecting the workers for examination, the value of the clinical examination, and the importance of technically satisfactory radiograms, and, finally, the desirability of determining the concentration and composition of the dust to which the workers are exposed. Dr. A. Feil of Paris, discussing the action of cement dust on the respiratory organs in the light of a study of 157 workers, of whom 40 per cent. had been in contact with cement for more than 10 years, concludes that cement dust does not predispose to tuberculosis or to pneumoconiosis. Dr. Koelsch of Munich, writing on researches into the action on the lungs of different kinds of dusts, describes the investigations which he has carried out during 25 years and distinguishes the specific and grave changes produced in the lung tissues by silica from the effects of all other dusts. The serious and characteristic changes in the lungs depend in his view upon the proportion of free silica in the dust. It alone causes true silicosis. Other conditions may influence the changes found in the radiogram, such as the concentration of dust; the nature of the work—e.g., involving deep respiration; individual factors, connected with the defensive forces in the respiratory passages and in the tissues; and, finally, technical preventive measures. The presence in the dust of substances with a basic reaction restrains the action of free silica. Dr. Koelsch does not agree with the theory of W. R. Jones that sericite can cause silicosis. His own practical observations have shown that dust rich in sericite has produced no silicotic changes.

Dr. A. H. Vossenaar, chief of the medical service of the coal-mines in Holland, considers that silicosis is not an object of special interest in these mines, though it has to be dealt with from time to time. All coal-miners have initial and periodical medical examinations; all the records of unemployment, sickness, and hospital treatment of the miners are kept in a central institute; and a close coöperation exists between the medical service and the institute. Comparative figures of time lost through sickness show only a negligible difference in favour of coal-miners compared with rock-miners. Dr. Vossenaar has compared notes with Prof. Reichmann and Dr. Di Biasi in the Ruhr coalfield, where the incidence of pulmonary disease is high amongst the rock-miners. The reason for this difference between the two coalfields remains obscure. Radiological examination of 500 rock workers from different parts of the coalfield gave results which were regarded as practically negative, and this opinion was supported by the experts in the Ruhr. There seems good reason to believe that the progressive form of pulmonary fibrosis is not being produced in the coal-mines of Holland. Attention is drawn to the high incidence of silicosis in the mines of Siegerland and to its absence in those of Oberlahn; the composition of the rocks is almost similar in the two districts. Dr. Vossenaar quotes descriptions from several sources and cites cases, with radiographic illustrations, of pulmonary disease simulating silicosis, to show the divergence of views on the ætiology of the disease and the difficulty of diagnosis.

In the last paper in this collection Prof. Jötten and Dr. Stoechel of the Westphalian University describe the results already published elsewhere of intravenous injection into rabbits of various kinds of dust; they succeeded in producing silicotic lesions by injection of quartz.

SCARLET FEVER IN THE UNITED STATES

Surgeon-General H. S. Cumming states that the incidence of scarlet fever in the United States keeps at a fairly high level from one year to another, being approximately 200 cases per 100,000 inhabitants (*Bull. Off. int. Hyg. publ.* 1937, **29**, 2527). The mortality on the other hand remains low—viz., 2 deaths per 100,000 with a fatality-rate of about

1 per cent. Active immunisation with five doses of toxin as recommended by the Scarlet Fever Commission is not much employed. In Philadelphia, for example, with a population of more than 1,900,000, only 5528 Dick-positive children were immunised in the course of four years. The method is chiefly used for nurses before they reach their hospital stage and in orphan homes. The following causes, in Cumming's opinion, account for the scanty use of active immunisation: (1) the large number of injections required; (2) the severity of the reactions following one or more injections; and (3) the uncertainty of practitioners and public health authorities about the degree of protection conferred.

THE PROVINCE OF THE CHIROPODIST

A BOOK on the theory and practice of chiropody, published in 1935, was so well received that the author has been encouraged to improve and extend its subject matter.[1] In the preface to this second edition Mr. Sayle Creer pays tribute to Mr. Charlesworth's enthusiasm for his art and to hit endeavour to encourage in his students an honess outlook devoid of quackery. The publication of such a book as this, in which the scientific basis for all forms of treatment is kept before the student's mind, is in itself sufficient to arouse confidence in the attitude of the doctor to the chiropodist. It is mainly suspicion of the chiropodist's ignorance of the importance of the conditions he is treating that engenders distrust and prevents coöperation. The author here makes a clear distinction between the conditions that can be treated by his fellow practitioners and those which require surgery. His readers will appreciate the distinction when they have digested the carefully written chapters on anatomy and pathology. The chapters dealing with the major diseases of the foot properly precede those dealing with the ailments that lie rightly within the province of the chiropodist. These latter chapters are the product of a very practical mind and of wide experience, and are an invaluable guide to the practitioner. Mr. Charlesworth's book deserves a continued success.

CARDIOMEGALIA GLYCOGENICA CIRCUMSCRIPTA

DEPOSITION of glycogen in the myocardium is sometimes responsible for enlargement of the heart in infants, and a case of this kind is described by S. van Creveld and H. M. van der Linde (*Ned. Tijdschr. Geneesk.* 1937, **81**, 6000).

A boy aged 5 months was admitted to hospital with a five days' history of dyspnœa, cough, vomiting, anorexia, pallor, and sweating. There had been no fever, and the child had previously been quite healthy, though he had put on little weight during the last two months. He appeared very ill. The respirations were rapid and shallow and accompanied by working of the alæ nasi and inspiratory indrawing of the intercostal spaces. There was no cyanosis, but both ankles were slightly œdematous. The heart was greatly enlarged both to the right and to the left, with a soft systolic murmur best heard at the apex. The lungs appeared normal. The edge of the liver was palpable three finger-breadths below the costal margin. The urine contained a trace of albumin.

A tentative diagnosis of glycogenic cardiomegaly was made, based on the short duration of the symptoms and the absence of any obvious cause for the cardiac enlargement. The child's condition grew steadily worse, with cyanosis and increasing œdema, and death took place on the tenth day after admission. At autopsy, besides extreme hypertrophy of the heart, a patent foramen ovale was found, with expansion of the entire pulmonary arterial system. In the cardiac muscle a number of peculiar patches could be seen, with thickening of the overlying endocardium or epicardium. These, on microscopic examination, were found to consist of degenerated cardiac muscle with fibrotic infiltration; and on appropriate staining deposits of glycogen were detected in the degenerated muscle cells.

The authors point out that the cause of glycogenic cardiomegaly is at present unknown. They think their case lends support to the view that circulatory disturbances in the myocardium have something to do with it.

THE EPILEPTIC MOTOR-DRIVER

THE Norwegian government committee concerned with the problems of epilepsy has issued a memorandum on the epileptic motor-driver and motor-cyclist. The members of this committee are unanimous in thinking that epilepsy should be a definite disqualification for the driving of a public motor vehicle, whether it be an omnibus or taxi-cab. At present in Norway an epileptic must have had no attack for three years if he is to receive a licence to drive a car, but there are several cases on record of a recurrence of epileptic fits after a three-year interval without any. If, for example, an epileptic is kept systematically under phenobarbitone or bromide for three years during which he is free from fits there is a possibility that administration of the drugs will become less regular, or even be discontinued by a patient who imagines that the disease is cured. Under such conditions the fits are likely enough to recur, especially if sleep is limited or disturbed, alcohol is consumed, or work is hard and irregular. Freedom from fits for three years gives an assurance of permanency only when there is some definite guarantee that the favourable conditions of the past three years will be maintained. The following five conditions for the granting of a driving licence to an epileptic are accordingly laid down by the committee: (1) freedom from fits for at least three years; (2) an assurance that anti-epileptic medication will be continued systematically and undiminished under supervision; (3) absolute abstinence from alcohol; (4) examination and certification by a neurologist; and (5) continuous medical control either by a police surgeon or by a doctor who has to report to the chief of police. It is further pointed out in the memorandum that some similar step must be taken to control cycling by epileptics, for even the riding of a push bicycle by an epileptic may cause serious danger to himself and others.

Prof. G. Monrad Krohn, who is a member of the committee, adds a rider to its memorandum, pointing out that doctors should be explicitly exempted from the obligations of professional secrecy in relation to epileptics. But, while regulations should be drafted to this effect, they should not be so worded as to suggest that the medical adviser of an epileptic must make detective-like inquiries about his patient's motoring activities. Prof. Monrad Krohn also suggests that the chief medical officer of a district should, by the help of notifications, compile a list of epileptics which the police could consult. This suggestion implies that epilepsy would be added to the list of notifiable diseases.

PIRQUET CONTROL OF B C G VACCINATION

FOR several years the French B C G school held that no great importance need be attached to the control of B C G vaccination by tuberculin tests such as Pirquet's. According to this school, it was immaterial whether the person vaccinated with B C G did or did not become Pirquet-positive as a result of such vaccination. In Norway Dr. J. Heimbeck has for several years questioned the wisdom of this attitude, and in *Nordisk medicinsk Tidskrift* for Feb. 5th (p. 201) he relates how his opinion was formed.

During 1930, when Heimbech disregarded the evidence of tuberculin tests, he administered B C G to 43 nurses of whom as many as 10 shortly afterwards

[1] Chiropody: Theory and Practice. Second edition. By Franklin Charlesworth, F.B.A.Ch., Founder of the British Association of Chiropodists. London: The Actinic Press. 1938. Pp. 205. 15s.

developed tuberculosis which in 1 case proved fatal. This catastrophe impressed on him the necessity for tuberculin-testing, by which alone he could make sure that the B C G he had given had really induced an allergic state in the person vaccinated. The wisdom of this precaution is shown by the following figures. In the ten-year period 1927–36 he administered B C G by injection to 501 nurses, of whom 45 had to be omitted from the subsequent analysis for want of Pirquet supervision or for other considerations. Of the remaining 456, 341 became Pirquet-positive soon after the B C G vaccination, and only 9 of these afterwards developed tuberculosis. There were also 18 whose Pirquet reaction was so slight as not to fulfil the necessary conditions for a positive reaction, and 3 of these 18 afterwards developed the disease. There remained 97 nurses who did not become Pirquet-positive in response to the vaccination, and among them no fewer than 20 became tuberculous. These figures are interpreted as showing that unless B C G vaccination has induced an allergic state (as indicated by a positive Pirquet reaction) the aim of the vaccination has not been achieved and it is necessary to repeat it.

With regard to the duration of a positive Pirquet reaction induced by B C G, Heimbeck now possesses data suggesting that though a positive Pirquet reaction may disappear within three months of vaccination, its average duration is a matter of years. Even so, however, it seems wisest to regard the allergic state induced by B C G as more or less transitory, and to look around for means likely to evoke a more permanent allergic state. This, in his opinion, can best be attained by infection with virulent tubercle bacilli. With several of his nurses this has happened accidentally, and the feeble Pirquet reaction induced by B C G has been followed by the strong Pirquet reaction induced by contact with open cases of tuberculosis. But though Heimbeck advocates exposure to such infection after a nurse has become Pirquet-positive in response to B C G vaccination, he recognises the importance of arriving at a permanent allergic state by means less fortuitous than accidental infection.

THE LANCET 100 YEARS AGO

April 7th, 1838, *p.* 57.

From a leading article.

LIFE is held to be as precious in England as in any country; but it is singular that while the deaths of individuals are beheld with great sensitiveness, a callous indifference should prevail where death occurs on a large scale. In the Army Estimates there are two columns,—in the one are entered the figures 109,027, the number of men required to be voted; in the other column the charge for these is entered. . . . Nothing can be conceived more vague or delusive than the estimates, viewed as a system of accounts, nevertheless the Secretary at War is called upon to give some account of the expenditure of the *money* in the right-hand column. Of the loss of *men* in the left-hand column he never gives any account. In voting 109,027 men to be distributed over various climates, the Legislature perhaps votes away 2000 lives every year. . . . The average force in the West Indies from 1816 to 1828, was 8293; the average deaths 1044 a year. Parliament voted 1044 lives annually, to be offered up to the demon of the West India climate, without ever asking the Secretary at War for an account of this part of his stewardship. When he asked for money some acute economist would inquire what he had done with the sums voted last year. When he asked for lives, no voice was raised. . . . If Parliament voted that 10 men should every year be drowned in the Thames, and the happiness of the country depended upon the sacrifice, this would excite endless horror. . . . Change the scene,—send 10,000 men safely down the Thames, and devote 1000 of them every year to certain death in the West Indies,—and no one asks how many have died, or whether 500 might not have been saved?

Appointments

BROWN, J. T., M.B. Glasg., D.P.H., Deputy Medical Officer of Health and School Medical Officer for Accrington.

FAWCETT, R. E. M., M.B. Lond., Resident Medical Officer at the Leicester General Hospital.

HOWKINS, JOHN, M.S., M.D. Lond., F.R.C.S. Eng., Assistant Physician-accoucheur and Demonstrator of Practical Midwifery, St. Bartholomew's Hospital.

LYLE, W. F., M.D. Belf., D.P.H., Medical Officer for Morecambe and Heysham.

PHILP, J. F., M.B., F.R.C.S. Edin., Resident Surgical Officer at Ancoats Hospital, Manchester.

PROTHEROE, T. S., M.R.C.S. Eng., Assistant Medical Superintendent at the Royal Sea-Bathing Hospital, Margate.

RAFTERY, J. D., B.Sc., D.Phil. Oxon., M.R.C.S. Eng., House Surgeon at the Hammersmith Hospital (British Post-graduate Medical School).

SALT, P. G., M.A. Camb., M.R.C.S. Eng., Hon. Dermatologist to the Kent and Canterbury Hospital.

SAVAGE, THOMAS, M.R.C.S. Eng., Assistant Resident Medical Officer at the City of London Maternity Hospital.

SQUIRES, H. C., M.D. Oxon., F.R.C.P. Lond., Consulting Physician to the Sudan Government.

TOMLINSON, A. M., M.B. Manch., Resident Medical Officer at the City of London Maternity Hospital.

WELSH, FAUSETT, M.B. Birm., F.R.C.S. Eng., Assistant Surgeon to the Birmingham United Hospital.

Certifying Surgeons under the Factory and Workshop Acts: Dr. A. BREMNER (Sheffield East, York, W.R.); Dr. B. A. ABBOTT (Rugeley, Stafford); Dr. MARJORIE S. BARTLETT (Saffron Walden, Essex); Dr. J. S. JEROME, M.C. (Cleobury Mortimer, Shropshire); Dr. K. J. A. GILLANDERS (Cromarty, Ross and Cromarty).

Medical Referee under the Workmen's Compensation Act, 1925: Dr. J. T. INGRAM of Leeds, for the Bradford, Keighley, Otley, Skipton, Dewsbury, Wakefield, Halifax, and Huddersfield County Court Districts (Circuit No. 12), with a view to his dealing in particular with dermatological cases.

Births, Marriages, and Deaths

BIRTHS

BELL.—On April 1st, at Bentinck-street, W., the wife of Mr. Arthur C. Bell, F.R.C.S.—a son.

BIGBY.—On April 2nd, at Southampton, the wife of Dr. W. L. M. Bigby—a daughter.

FAGGE.—On April 1st, at Nuffield House, Guy's Hospital, the wife of Dr. Charles Hilton Fagge, of Braintree—a son.

FOX.—On March 31st, at Greenhouse, Rotherfield, to Margaret and T. F. Fox—a son.

IRLAM.—On April 2nd, the wife of Dr. S. G. Irlam, of Plymouth—a daughter.

MALKIN.—On March 28th, at Nottingham, the wife of Mr. H. Jordan Malkin, F.R.C.S.E.—a daughter.

WALMSLEY FISHER.—On March 27th, at Edinburgh, the wife of Captain G. B. Walmsley Fisher, I.M.S.—a son.

WITTS.—On April 4th, at Devonshire-place, W., the wife of Prof. L. J. Witts—a son.

DEATHS

DENSHAM.—On March 28th, in Cape Town, Henry Bryan Densham, M.B., C.M. Edin., of Stockton-on-Tees, in his 75th year.

DINGWALL.—On April 3rd, at Hove, Archibald Dingwall, M.D. Aberd.

FOX.—On March 31st, at Hill Cliff, near Warrington, Edward Joseph Fox, F.R.C.S. Eng., aged 65.

GENT.—On April 1st, at Southbourne, William Conway Gent, L.R.C.P. Edin., aged 76.

GODDING.—On March 31st, at Worthing, James Godding, O.B.E., Col. T.F., T.D., M.R.C.S. Eng.

MORRIS.—On April 3rd, John Morris, M.B. Oxon., of Watlington, in his 38th year.

REDDING.—On April 4th, at Ladbroke-grove, W.11, J. H. Douglas Redding, L.R.C.P. Edin.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

POST-GRADUATE COURSES IN GERMANY.—The German authorities for post-graduate medical instruction have arranged for international courses in the specialties to be held during the summer at various centres. The courses will all be given in German. Further information may be had from Aerztliches Fortbildungswesen, Robert Koch-Platz 7, Berlin, N.W.7.